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MODERN MILITARY AIRCRAFT

VOODOO

By Lou Drendel
and Paul Stevens

squadron/signal publications

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Illustrated By Lou Drendel

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(Overleaf) F-101 Voodoo crew in pressure suits with early model Hughes AIM-4 Falcon missiles. Pressure suits were normally only worn when the flight was expected to exceed 50,000ft. (USAF)

CREDITS

Literally hundreds of individuals and military organizations have contributed to my F-101 research over the past twenty years. I gratefully acknowledge the time and material contributed by the following:

Col Richard Baird, Col Harry Barco, Sgt Andrew® Barna, Gerry Beauchamp, Jack R Bol, Major Ward Boyce, Kenneth W Buchanan, Robert Burgess, Sgt David Colbert, Thomas S Cuddy II, Bill Curry, Col Adrian E Drew, Col Clyde B East, Dr Carlton A Eddy, Dean Englehardt, Edward M Flesh, John F Fuller, Col Jonathan Gardner, General Lawrence L Garrison, General Wayne C Gatlin, Gerald Geer, Clyde Gerdes, Col William H Greenhalgh, C Mike Habermehl, Abbott Hafter, Frank C Hartman, Col Norman P Huggins, Capt David H Hughley, Col Marion H Havelaar, Sgt Marty J Isham, Major John J Jacobs, Col Chris Jessen, Col George Kelley, Dennis E Kelsey, Major Edwin K Kitow, Jr, Sgt Ben Knowles, Art Kreiger, William T Larkins, Major Jerry D Lents, Peter B Lewis, Col Brian J Lincoln, Major Edward S Lucas, Charles B Mayer, Col Thomas W McGuire, Col Frank McKee, Sgt David W Menard, Stephen H Miller, Sgt Kirk Minert, Merle Olmstead, Douglas D Olson, David Ostrowski, Col C Robert Osborne, Sgt Richard H Paige, Major John E Panghurst, Col Robert M Parker, George W Pennick, Capt Robert E Peters, Ronald Picciani, Dick Powers, Capt W Patrick Reaves, Major Wayne I Roberts, John Robertson, Capt Brian C Rogers, Col Ray W Schrecengost, Douglas E Slowiak, Capt Robert W Stamm, Col John Stavast, Jim Sullivan, Col Robert M Sweet, Sgt Norman E Taylor, Walter A Trimborn, Col Donald R Tonole, Capt Thomas S Waller, Col Burton L Waltz, Col James G Waugh, John T Wible, Capt Greg Williams, Major Charles F Wood, James P Wood

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DEDICATION

This book is dedicated to the RF-101 airmen who were shot down over North Vietnam.

Capt Herschel S 'Scotty' Morgan	45th TRS	Shot down	3 Apr 1965
Capt Charles E Shelton	45th TRS	Shot down	29 Apr 1965
Capt Robert A Stubberfield	45th TRS	KIA	6 May 1965
Capt Marvin N Lindsey	45th TRS	KIA	29 Jun 1965
Capt Jack W Weatherby	45th TRS	KIA	29 Jul 1965
Capt Frederic M Mellor	363rd TRW	KIA	13 Aug 1965
Capt George R Hall	15th TRS	Shot down	27 Sep 1965
Maj Wilmer N 'Newt' Grubb	20th TRS	KIA (POW)	4 Feb 1966
Capt Gordon L Page	15th TRS	KIA	7 Mar 1966
Capt Jerdy A Wright Jr.	15th TRS	KIA	7 Mar 1966
Capt Arthur W Burer	45th TRS	Shot down	21 Mar 1966
Maj Daniel J Doughty	45th TRS	Shot down	2 Apr 1966
Maj Alan L Brunstrom	20th TRS	Shot down	22 Apr 1966
Maj Albert E Runyan	20th TRS	Shot down	29 Apr 1966
Maj James F Young	20th TRS	Shot down	6 Jul 1966
Maj William D Burroughs	15th TRS	Shot down	31 Jul 1966
Maj Blair C Wrye	20th TRS	KIA	12 Aug 1966
Capt Vincent J Connolly	20th TRS	KIA	4 Nov 1966
Capt Arthur L Warren	20th TRS	KIA	5 Dec 1966
Maj Notley G Maddox	20th TRS	KIA	20 May 1967
Capt Charles C Winston III	20th TRS	KIA	1 Aug 1967
Maj Bobby R Bagley	20th TRS	Shot down	16 Sep 1967

All of these listed as shot down were found to be POWs and were released in February of 1973 except Capt Charles E Shelton of the 45th TRS who was shot down over Laos on 29 April 1965, and is still listed officially as a POW.

INTRODUCTION

The McDonnell F-101 Voodoo was originally conceived and partially developed for The Strategic Air Command (SAC) as a Long Range Strategic Fighter Escort (F-101) and Reconnaissance Aircraft (RF-101). SAC reconnaissance Voodoos would have been capable of delivering nuclear weapons as a secondary mission, however, their primary mission was to take strike photos and successfully return to their base. SAC considered their 'Fighting 101' to be semi-expendable — once their nuclear weapons had been delivered.

However, SAC leaders became increasingly bomber oriented during the Voodoo's development and slowly lost interest in the fighter. SAC brass began envisioning their new B-52 Stratofortress as being nearly invincible, and began seeing their projected Voodoo fleet as little more than a nuisance which would drain off vital tanker resources. Following this change of thinking SAC relinquished development of the reconnaissance variant of the Voodoo to Tactical Air Command (TAC) in December of 1955, sixteen months before the RF-101 became operational. However, SAC retained their 'Fighting 101s' until 1 July 1957.

Air Defense Command (ADC) had originally rejected McDonnell proposals for an interceptor version of the F-101 as being too costly, however, ADC reversed itself when the Convair F-102 'interim' interceptor encountered performance problems, and the F-106 'ultimate' interceptor program fell years behind schedule. Thus, three basic models of the McDonnell F-101 Voodoo design eventually evolved:

Strategic Fighter	F-101A and F-101C
Photo Reconnaissance	RF-101A and RF-101C
Interceptor	F-101B and F-101F

The fourth pre-production F-101A (53-2421) 'Fighting 101', standing next to a Boeing B-47 Stratojet, one of the SAC bombers it was designed to protect. (McDonnell)

F-101 VOODOO STRAGEGIC FIGHTER

When The Strategic Air Command (SAC) was formed on 21 March 1946, it included one group of P-51 Mustangs. The Mustang was the first really successful long range bomber escort, and World War II had proven the necessity of providing bombers with fighter protection. The postwar Air Force was about to leap into the jet age, and it was obvious to SAC Commander General George C Kenney that SAC would need a long range jet fighter to escort the B-47 Stratojet which was soon to become operational. Since existing jet fighters were of limited range, experimental development contracts were awarded to McDonnell (XF-88) and Lockheed (XF-90) in June of 1946 to develop a heavy long range 'Penetration' fighter. Neither experimental fighter had flown by mid-1948, when President Harry S Truman and his Secretary of Defense, James V Forrestal endorsed plans that placed heavy emphasis on SAC Atomic Bombing capability as a deterrent force.

On 20 October 1948, six months behind schedule, the initial XF-88 prototype (46-525) was rolled out. Powered by a pair of 3,000lb thrust Westinghouse J-34-WE-13 turbojet engines, it was flown for the first time nine days later. Maximum speed was 641mph. The six month delay had been caused by a complete redesign of the wing, providing the XF-88 with a thirty-five degree swept wing instead of the straight wing of the original design proposal, and changes in the air intakes.

On 16 December 1948 McDonnell was advised to cease XF-88 development, and prepare a detailed accounting of funds expended. USAF cancellation of contracts for 239 airplanes, worth 300 million dollars followed shortly. The Air Force had decided to spend its increasingly meager postwar budget making modifications to their fleet of operational Convair B-36s and Boeing B-50s, and to purchase additional B-36s. Fiscal Year 1950 (FY 50) money which had been allocated for F-88 production was used to buy North American F-86D Sabre all weather interceptors, which would 'defend America from Russian bombers'.

The appearance of Russian MiG-15 jet fighters over Korea during the fall of 1950 led to a reevaluation of the SAC fighter escort equation. SAC B-29s — one of the Atomic bombers which were supposed to deter the Soviets — proved to be virtually defenseless against the MiG-15 and were being shot down left and right over North Korea by the new Soviet jet fighter. And it was just as obvious that F-80 Shooting Stars and F-84 Thunderjets couldn't stand up against the MiG. SAC efforts to develop a parasite fighter (McDonnell XF-85 Goblin), or to try to drag along a fighter escort via wingtip-to-wingtip hookups had proven impractical. Clearly, SAC needed a long range supersonic bomber escort. The F-88 program was hurriedly reinstated.

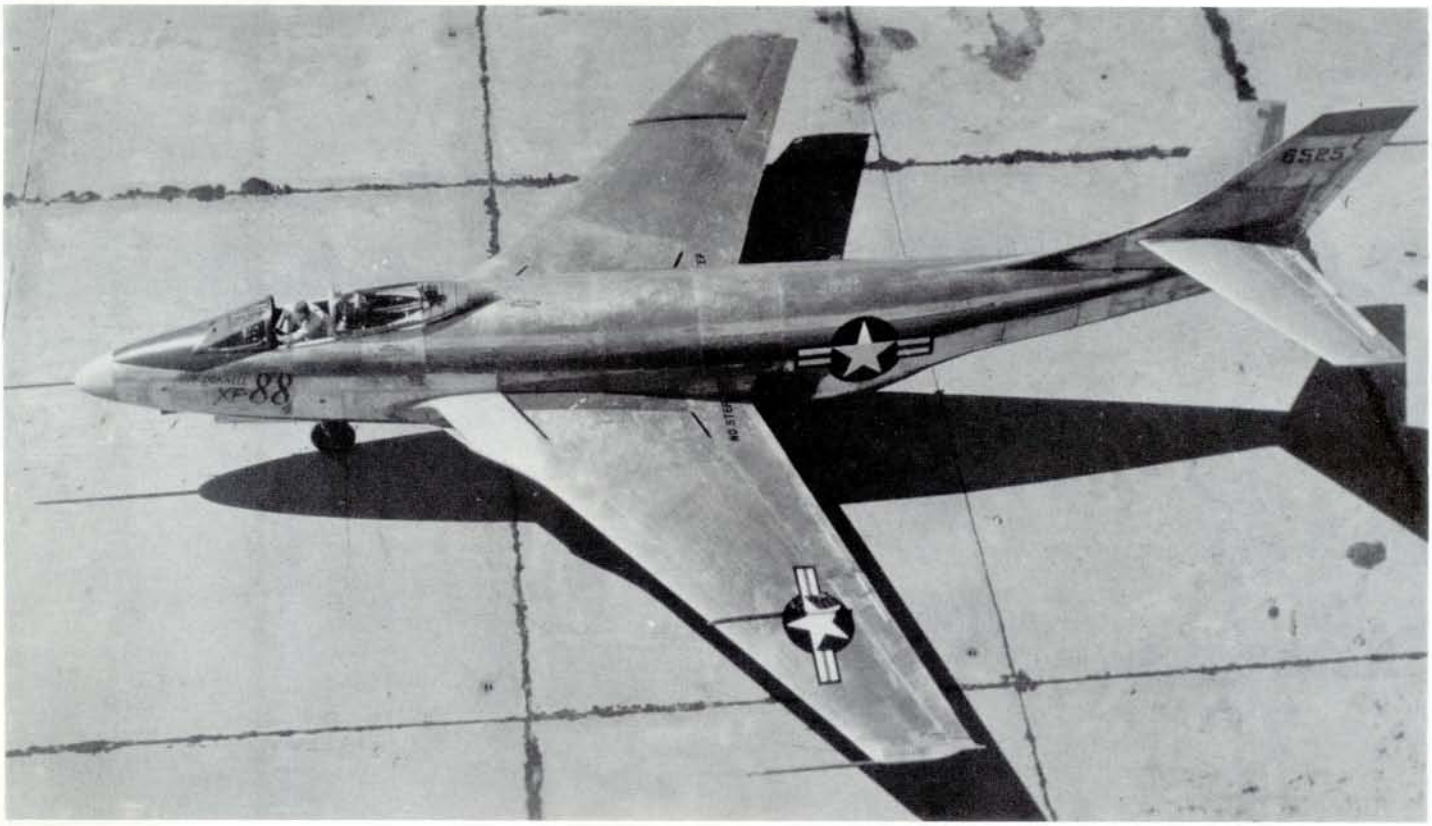
The second prototype (46-526), powered by a pair of Westinghouse J-34-WE-15 engines with short afterburners and under the designation XF-88A, beat out the Lockheed XF-90 and the North American YF-93 in fly off competitions during the summer of 1950. However, a production contract was still not forthcoming. USAF decided it wanted another evaluation, one not limited to the previous three contenders. Further proposals were solicited, and the Lockheed F-90 and F-94D, McDonnell F-88, North American F-93, an improved Northrop F-89, and three variations of the Republic F-84 were considered.

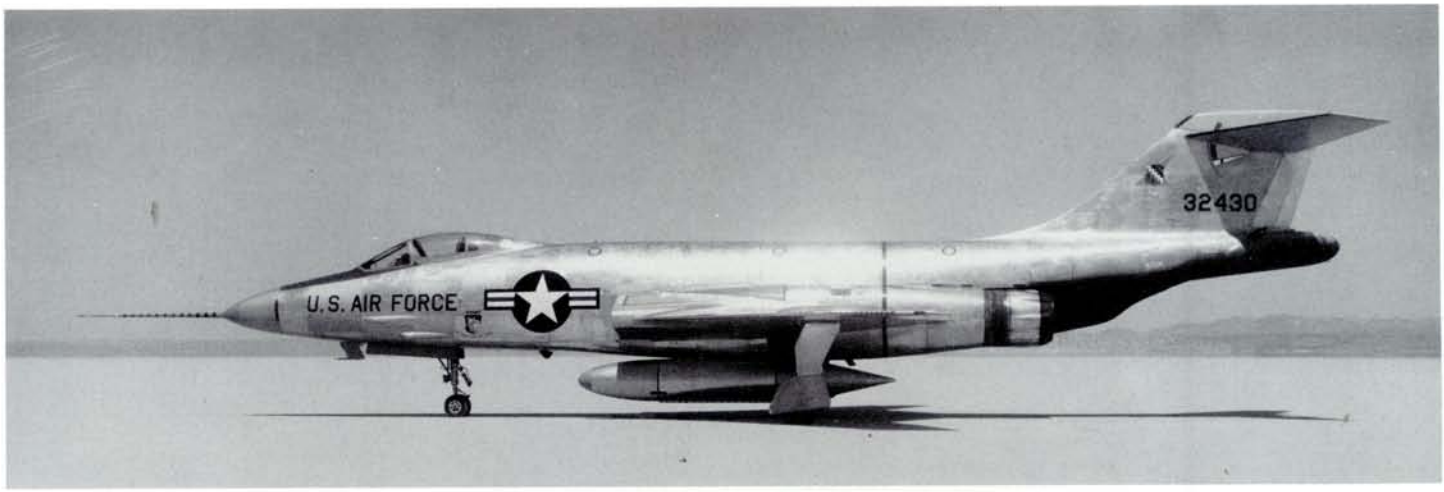
The XF-88A, was declared the winner on 29 March 1951. Although engineering and development work continued on the F-88, there would be no money available for production aircraft until October of 1951. Ironically, that would be the same month that Soviet MiG-15s took such a heavy toll of B-29s that they were withdrawn from daylight bombing missions over most of North Korea.

F-101A Strategic Fighter

The F-88 design was loaded down with overweight government furnished equipment and subsystems which severely retarded its performance. Realizing that the aircraft could be obsolete before it even became operational, McDonnell recommended that the Westinghouse engines be replaced by Allison J-71 engines. USAF countered with a recommendation for a pair of afterburning 14,500lb thrust Pratt & Whitney J-57-P13 engines, which would potentially provide the F-88 design with a Mach 1.5 dash capability. This led to a complete redesign program which ultimately resulted in the birth of the McDonnell F-101 Voodoo. A production go ahead was given in October of 1951 with the designation officially being changed from F-88 to F-101 in November. The first in a series of development and production contracts that would be negotiated, renegotiated and changed by USAF, was issued to McDonnell in January of 1952, with the first mock up inspection being made on 21 July 1952. In May of 1953 USAF finally issued a contract for twenty-nine pre-production F-101As.

The forerunner of the Voodoo was the XF-88 the design of which was initiated in June of 1946. The initial prototype (46-525) was delayed by six months when the wings and horizontal stabilizers were completely redesigned, replacing the straight wings with a thirty-five degree sweep. (McDonnell)





The thirteenth pre-production F-101A (53-2430), is adorned with both the badges of The Air Research and Development Command (ARDC) and Edwards AFB on the dry lake at Edwards, 20 June 1956. A drop tank has been fitted to the centerline. (USAF)

The J-57 powered F-101A Voodoo, with a combat radius of 800 nautical miles which could be extended via probe and drogue inflight refueling, was intended to serve as a long range fighter escort. And with a speed of 918 knots at 35,000ft, armed with four nose mounted T-160 rapid fire 20mm cannon with 375 rounds per gun, and a combat ceiling of 62,600ft, it was a potent weapons system. With a wingspan of 39ft 7in, length of 65ft 8in, height of 18ft 4in, and an empty weight of 24,977lbs, it was a big airplane, considerably bigger than the XF-88. The fuselage carried five separate self sealing fuel tanks, which held 1,924 gallons of fuel, bringing maximum gross take off weight to 44,956lbs, giving the F-101A a wing loading of more than 128 pounds per square foot! It was still basically an enlarged and updated F-88 which incorporated the better features of its predecessor. Retained were the thin thirty-five degree swept wings, irreversible power boosted controls, yaw dampers for improved stability, and the short afterburners. The McDonnell F-101 Voodoo was expected to be a modest design risk, with few teething troubles, since most of the critical technology had been developed for the F-88.

The Korean War had added an urgency to all military programs, and the F-101 was no exception. It was to have been developed and manufactured under the Cook-Cragie plan of using production tooling and ordering larger quantities of long lead time items. Developing production tooling at such an early date allowed McDonnell to initiate F-101 production as flight testing was conducted, with early production components being brought up to operational standards as they were delivered. The Cook-Cragie plan saved a great deal of time, but could result in staggering cost overruns if a project encountered serious delays. During their 21 July 1952 mock-up inspection, USAF officers approved nearly ninety changes, half of which were under contract obligation.

In October of 1953 McDonnell and USAF released specifications which indicated that there was a growing sentiment to convert the Voodoo from a bomber escort to a strategic fighter, which could carry "special weapons". The MA-7 fire control system had replaced the original J-6 system, and provisions for self sealing fuselage fuel tanks had been dropped on all but the critical 445 gallon sump tank. Armor protection for the pilot, which had been included in the F-88 was deleted. With the addition of a radar drift computer, LABS equipment, M-1 Toss Bomb Computer, T145 Release and up to 4,000lbs of externally carried stores, take off weight increased to 45,225lbs. Carrying bombs over long distances and delivering them at low altitude also required beefing up the airframe. McDonnell proposed building the original airplanes with a stress rating of 6.33G (F-101A), with subsequent models being up-rated to 7.33G (F-101C). Initial production aircraft would be used to determine which modifications would be necessary to accomplish the 7.33G beef-up.

Mock-up inspections of the A-bomb carrying F-101 were made in March of 1953, and by the end of the year, the Voodoo's primary mission had evolved to that of strategic fighter bomber. It's length had increased from 65ft 8in to 67ft 4in, and further increases in weight had dragged the combat ceiling down to 54,950ft, but dash speed capability remained high at 920 knots at 35,000 feet. But the F01's range was still 200 miles short of what USAF wanted, and McDonnell worked hard to extend it. One option was the deletion of the 20mm cannon ammunition and installation of a 252 gallon fuel tank in the huge armament bay. McDonnell also designed an immense combination weapons/fuel pod which held 703 gallons of usable fuel. This configuration resulted in a take off weight of 49,959lbs, 19,624lbs of which was fuel. A high altitude profile would have resulted in a combat radius of 1287 nautical miles during a five hour mission.

The end of the Korean War brought an end to USAF crash programs to rearm, allowing USAF to proceed with aircraft procurement in a more leisurely fashion. Since the F-101A had not been flight tested when the armistice was signed, a new "fly before you buy" policy was instituted to replace the Cook-Cragie plan. This resulted in a hold being placed on both funds and production of the F-101 until Category II flight testing was completed. (This was anticipated to be March, 1957.)

Construction of the first F-101A (53-2418) was completed during the summer of 1954. The Voodoo's "first flight" was a less than glamorous ride to Edwards AFB in a pair of Douglas C-124 Globemasters. After reassembly, McDonnell's chief test pilot, Robert C Little, initiated flight testing on 29 September with a thirty minute flight that included a Mach 1.07 dive. USAF evaluations began thirty-seven days later, when the CO of Edwards, Brigadier General J S Holtner, became the first military pilot to fly the Voodoo.

However, as has been the case with most high performance aircraft, serious problems were encountered. The first problem encountered by McDonnell test pilots was during the second flight when engine compressor stalls were experienced during accelerated flight. It was found that these compressor stalls could be severe and significantly restricted maneuverability and overall performance of the aircraft. McDonnell engineers quickly determined that the Pratt & Whitney J-57 engines were extremely sensitive to pressure variations over the compressor face. But it took several months of wind tunnel testing and experimenting with intake ducting before a satisfactory inlet configuration was developed — and this only at a significant reduction in aircraft performance.

But the most serious challenge McDonnell engineers faced was a control problem resulting from the 'T' tail configuration, which had been designed as a weight saving measure. At high angles of attack and/or high G maneuvering, turbulence from partially stalled wings could develop which would negate the stabilators positive lift, causing the aircraft to pitch up longitudinally. A fully developed pitch up would result in sixty to eighty degree nose high pitch angles, rapid bleed off of airspeed, with the plane usually going into a spin. McDonnell reportedly played down the pitch up

This F-101A (53-2440), one of ten aircraft from block 15 of the pre-production series, seen at Edwards during the test program in 1956. Hardware for a drop tank has been installed on the centerline. (USAF)

phenomenon initially, with the thought that the airplane would eventually recover without pilot input. However, military pilots who experienced a pitch up in the Voodoo, including Captain Brian J Lincoln, were not so sure. Capt Lincoln had been in the fighter branch at SAC headquarters, and was among those conducting Phase VI tests on the Voodoo. His pitch up occurred at night, while attempting a supersonic split-S from 37,000ft. (A split-S is begun from level flight. The aircraft is rolled inverted, then pulled down and through a vertical 180 degree heading change. The higher the airspeed on entry, the more dangerous this maneuver is, since considerable additional speed is built up during the split-S). Capt Lincoln finally regained control at 10,000 feet, with the aid of a good drag chute. However, Captain John T Dolan apparently lost control of his F-101 during December of 1955, and rode it to his death on the desert floor while trying to recover from a pitch up. Unfortunately, the accident occurred during an early check ride and was not fully documented. On 10 January 1956, Major Lonnie R Moore, the Korean War Ace with ten MiG-15 kills, was killed in a pitch up accident while taking off from Eglin AFB. His death brought the pitch up problem into sharp focus and threatened to end the 101 program. USAF leaders reasoned that if a pilot of Moore's capability could pitch up and lose control, then the airplane would certainly be too much for the average line pilot to handle.

However, extensive wind tunnel and flight testing demonstrated that the Voodoo would pitch up at a predictable point, which was prior to its stalling. This established the basic flight envelope. Tests also demonstrated that the pitch up and resulting stalls were quickly followed by incipient spins if pitch up recovery was not immediately initiated. The incipient spin was highly oscillatory in pitch, and the direction of rotation changed frequently. After several turns the airplane entered steady state spin, from which no recovery had been demonstrated. The pitch up was a harrowing experience, which usually included violent maneuvers, especially when encountered during supersonic flight.

The technique for recovery included application of full nose down stabilator, and neutralization of rudder and ailerons. Recovery from a fully developed pitch up necessitated deployment of the drag chute at the top of the pitch cycle (as negative G was sensed). The drag chute helped to pull the nose down, which facilitated the recovery of flying speed. A great deal of altitude was required for recovery from a pitch up, and no two pitch ups were alike. During a successful recovery, the airplane was out of control from four to eight seconds.

McDonnell engineers worked day and night to find a fix for the pitch up problem, without success. The result was another production hold, imposed by USAF in May of 1956, with a complete reevaluation of the entire 101 program undertaken during the following three months. However, most pilots who had flown it thought the 101 could be flown safely, even without the

An unsuccessful effort was made to area rule the F-101 fuselage by adding a filler just above and in front of the after burner of 53-2442A. It was returned to its original configuration after tests. The badge of the Air Proving Ground Command is carried on the tail. (McDonnell)

The F-101 Voodoo could out accelerate all of its Century Series siblings from sea level to 20,000ft, including the F-106 Delta Dart which was absent from this family portrait. (USAF)

pitch up problem being solved. During subsonic flight, the airplane would buffet as it approached pitch up boundaries, giving the pilot plenty of warning. Unfortunately, little or no warning occurred at supersonic speed, but test pilots quickly learned they had to maintain higher minimum airspeeds to stay within the airplane's flight envelope. They developed a rule of thumb which allowed them to maneuver throughout the flight envelope without fear of pit-

The four rapid fire 20mm M-39 cannons mounted in the forward fuselage section caused serious problems until the gas vent was revised to exhaust upward away from the engine intakes.

ching up. They could pull approximately one G of flight load for every 100 knots of indicated airspeed available. The flight envelope of most airplanes was defined by stall speeds, the F-101's flight envelope was defined by pitch up boundaries. These boundaries did not seriously reduce maneuverability, which was already limited by the heavy wing loading. It was possible to perform all basic combat maneuvers with the F-101, but some maneuvers required more space and a steadier hand on the stick.

USAF finally concluded that they could save the F-101 program from a costly termination by diverting production from "Fighting 101s" to reconnaissance and interceptor models which did not require Air Combat Maneuvering (ACM) capabilities, (actually, this was before the term 'ACM' had entered the lexicon of aerial combat — it was 'Dogfighting' in the 1950s). The F-101s long range and outstanding dash speed capability would serve well in both roles. Still, USAF was reluctant to turn pilots loose with the Voodoo without electronic aids to keep the pilot within the flight envelope. McDonnell developed a pitch inhibitor system which provided the pilot with a warning horn as pitch-up was approached. This was enough to satisfy USAF, and production was ordered resumed on 26 November 1956.

McDonnell had spent the summer and fall of that year making some 300 USAF approved changes and modifications as well as some 2,000 of their own engineering improvements to the large number of F/RF-101s in various stages of construction. Since production had been running well ahead of the flight test program, this six month production delay actually gave engineering a welcome opportunity to catch up with production.

Although numerous mechanical and structural problems were encountered during the test program, McDonnell engineers and technicians quickly resolved most of them. However, two areas of concern that still plagued the Voodoo late in the flight test program were the tires and the 20mm M-39 cannon. Excessive tire wear and frequent blowouts continued throughout the entire test program and into operational service. The thin F-101 wings would not accommodate wheels wider than 8.8ins, and the maximum take off weight of 51,000lbs put tremendous strain on the main gear tires. It took a long time for tire manufacturers to develop a 22 ply tubeless tire which could stand up under these conditions. Pilots were especially careful when they had to taxi long distances on a hot day, they taxied very slowly, and brakes were used sparingly before anti-skid brakes were installed. They also made afterburner takeoffs to reduce tire wear. Fortunately the Voodoo could be landed successfully with a blown tire and take offs were generally continued if a tire blew at or near lift off speeds. A big concern with the blowout of high pressure tires was damage to the hydraulic lines. Landing the Voodoo with a hydraulic failure was at best a dicey proposition, especially in a crosswind. Going off the runway invariably meant tearing the gear off and frequently resulted in class 26 damage to the big fighter.

The four rapid fire 20mm cannon mounted in the forward fuselage caused McDonnell more than a little grief. Gun gas was vented down and out of early production aircraft until it was discovered that the vented gas was causing compressor stalls. The F-101 was modified to vent the gases upwards. This alleviated compressor stalls, but vibrations and excess unvented gas combined to blow access panels off of the airplane. To solve this problem the gas vent system was further modified and the access panels strengthened. Even so, Phase VI test reports indicate that the Voodoo was found to be a poor gunnery platform due to its poor lateral directional stability, especially in turbulent air. Less than fifty per cent of all perfectly aimed rounds fired would hit a 15 X 15 foot target panel at a range of 1500ft!

Having lost its enthusiasm for the strategic fighter concept SAC planned to turn its fighters over to TAC, but TAC was not wildly enthusiastic about receiving the 101. The Voodoo, with its heavy footprint pressure, was not suitable for operations from hastily prepared forward operating locations.

Besides the twenty-seven pre-production F-101As forty-eight production F-101As were ordered. Original plans called for delivery of production F-101As to SAC's 27th Strategic Fighter Wing (27th SFW) at Bergstrom AFB, Texas beginning in June of 1956, but development problems delayed the 'Fighting 101's' arrival until May of 1957.

The Voodoo was preceded to Bergstrom by both its reputation, and its flight simulator, with both having a profound impact on the pilots transitioning from Republic F-84s. The Voodoo's reputation helped to temper the hot shot fighter jocks, and the Voodoo's flight simulator reinforced this caution while providing realistic training. Both probably saved lives. McDonnell also sent experimental test pilots to Bergstrom and Shaw AFB, where they outlined the F-101's performance envelope and fully explained the pitch up phenomenon.

Every USAF unit that eventually transitioned into the 'Fighting 101' had previously flown F-84s. The 101 and the 84 were worlds apart in flying characteristics and performance, which brought about some drastic departures from old flying habits. Colonel C Robert 'Oz' Osborne Jr, one of those who made the transition said, "The F-84F was a big hog. It took a lot of muscle and there was no way you could hurt yourself or the airplane unless you just mushed into something because it didn't respond too well. The F-101 was a lady — a fantastic airplane, but touchy — very touchy! It had to be flown properly. No more bank and yank — Goddam!"

Many pilots considered the Republic F/RF-84F a 'dangerous' airplane because of it's long take off roll. Not so with the F-101! Former reconnaissance pilot, Colonel Jonathan Gardner said "...the first ride, you didn't fly it — you hung on to it! It was truly an experience to climb out of an 84 and into that airplane, especially a clean one on a cold day — and plug in the afterburners!"

Pilot and crew chief confer at Eglin AFB, Florida during weapons testing of the F-101A. (USAF)

Major Adrian Drew established the world's absolute airspeed record at 1,207.6 MPH on 12 December 1957 while flying an F-101A. His record stood until the following May, when an F-104 Starfighter bettered it by almost 200mph. (USAF)

On 1 July 1957 SAC relinquished the 'Fighting 101' when the 27th SFW was transferred, along with their Voodoos, to The Tactical Air Command with the 27th Strategic Fighter Wing being redesignated to the 27th Fighter Bomber Wing (FBW). Maintenance and Administrative/Command functions were reorganized, but the flying mission did not appreciably change; their primary mission being nuclear strike. Virtually all of the 27th FBW's resources (481st, 522nd, 523rd, and 524th Fighter Bomber Squadrons) went into low level navigation training, and Low Altitude Bombing System/Low Angle Drogued Delivery (LABS/LADD) special weapons delivery training after pilots had transitioned from their old F-84Fs. Instructor pilots like Captain George Kelley taught line pilots how to scream across sparsely populated West Texas at altitudes of 50 to 100ft with great precision.

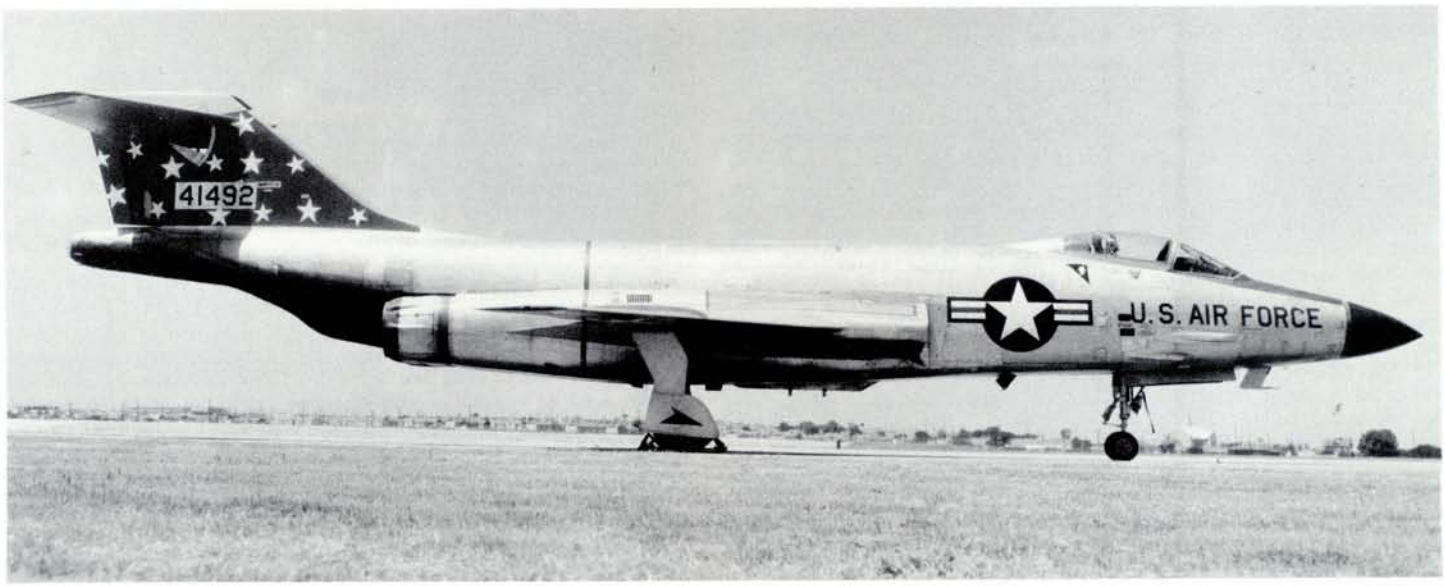
Unfortunately, the 27th SFW maintenance men were hard pressed to provide the pilots with enough flying time to transition properly. They were faced with a serious shortage of spare parts, support equipment, in-depth technical manuals, and autopilots — even fuel line clamps were hard to come by, and the hydraulic system, baked by the Texas sun, was beset with problems. These problems were accentuated by the outside storage of early production aircraft at McDonnell's Lambert Field facility, prior to delivery. Production flow time for an F-101 was approximately 200 days, which resulted in a number of early production aircraft being completed before the original pitch up inhibitor system was developed; these early aircraft had been stored outside while they awaited modification and subsequent delivery. It took a lot of hard work by maintenance men of the 27th together with McDonnell tech reps to iron out these problems, but by the middle of 1958 the 27th FBW was well on its way to being combat ready.

The 522nd Fighter Bomber Squadron (522nd FBS) was commanded by the legendary fighter tactician Major (later Lt General) John J 'JJ' Burns. Burns had been the F-101 project officer at SAC Headquarters, and had been primarily responsible for having radar installed in the 'Fighting 101'. The radar had been designed for air-to-air combat and as a high altitude navigational aid. Burns and civilian Tech Reps modified the radar so it could also be used to bomb at night or in weather. Burns used the F-101 simulator and a Convair T-29 navigation trainer to teach his pilots how to use the radar bombing techniques he had developed.

Despite the F-101's early problems, pilots of the 27th made a number of significant and/or record breaking flights with their 'One-O-Wonders' during 1957 and 1958. Some of these flights were directed from Washington, but most were tests to better document the aircraft's performance, and pilot capability and techniques. Major Adrian E Drew, CO of the 481st FBS, flew a pre-production F-101A (53-2426) to an absolute world speed record of 1,207.6 mph over Edwards AFB on 12 December 1957. Although it was implied that the record had been set in an operational aircraft, it was in fact a test aircraft with higher thrust engines. Drew had also been a SAC F-101 project officer and had participated extensively in Phase VI tests at Edwards prior to becoming the CO of the 481st.

F-101C

In September of 1957 the 27th FBW began to receive the upgraded F-101C. Essentially the same as the F-101A, the internal structure of the F-101C was beefed up to withstand a 7.33g load, where as the A series could only withstand a 6.33g load. Most of the structural strengthening took place in the



F-101C-40-MC of the 524th TFS, 27th TFW. 524th tail colors were Blue, while the 522nd was Red, 523rd Yellow, and the 481st was Green. The 27th TFW, initially SAC's 27th Strategic Fighter Wing, was the first unit to receive the 'Fighting 101' and suffered through the early teething troubles of the Voodoo, and they were legion.

wings. Essentially identical to the F-101A series the F-101C was armed with a quartet of forward fuselage mounted 20mm cannon,and was capable of carrying a one megaton tactical nuclear device. Forty-seven F-101Cs had been built when production terminated in May of 1958.

Major 'JJ' Burns led a flight of four F-101Cs from Andrews AFB, Maryland to Bierset AB, Liege, Belgium on 28 July 1958. The purpose of the flight was to demonstrate mobility to NATO dignitaries who had gathered for one of the largest international air shows ever held. The 3,455 nautical mile flight was made in a record six hours and eleven minutes through some very poor weather conditions. The 101s were refueled in flight three times by KC-135A tankers, which accompanied them along a portion of the route. Burns used his radar and a non-standard ARN-59 radio compass for navigation. He became an instant celebrity, thrilling the huge airshow crowd with a maximum performance takeoff in which he easily out distanced an F-104B Starfighter. The Voodoos were flown on to Soesterberg, Holland, RAF Bentwaters and Nouasseur AB, Morocco, North Africa, before returning to Bergstrom via Lajes (Azores) and Myrtle Beach AFB, South Carolina.

The 27th had proven that the McDonnell 'Fighting 101' was fully capable of performing it's strike mission and plans were made to deploy them to England, where they would be closer to potential targets in eastern Europe. On 10 August 1958 a vanguard of eight pilots, representing each of the 27th's four squadrons, took off from Bergstrom AFB for a non-stop training flight to RAF Bentwaters, England, the home of the 81st Tactical Fighter Wing. One pilot encountered mechanical problems and aborted, but the remaining seven aircraft made an uneventful eleven hour and two minute flight which included two over water inflight refuelings from KB-50 tankers. This experience was incorporated into plans for a mass deployment of Voodoos to Europe, which was scheduled for the following December and January. The seven aircraft returned to Bergstrom and were shortly followed by key members of the 81st TFW who immediately began transitioning into the 27th's Voodoos at Bergstrom and George AFB.

On 25 September 1958 three F-101s of the 27th took off from Kindley AB, Bermuda, Lt Edward B Turner (3:09), Captain James E Jarvis (3:27), and Captain Ronald J Layton (3:28), making what was then the longest non-stop, non-refuelled flight ever made by a supersonic jet. From Kindley AB, Bermuda to Carswell AFB, Texas, the record setting 1896 mile flight was timed to highlight the Air Force Association convention, which was being held in Dallas that year.

Although the 27th wing had been released from its alert commitment in order to concentrate on checking out pilots of the 81st TFW in the 'Fighting 101', the 522nd TFS was alerted on 2 September for a possible overseas deployment. At 0900hrs on the 6th they were notified they were going. Captain C R Osborne was among those selected to go. He was in Phoenix, enjoying the second day of the first family vacation in years, when he was notified. Driving all night, Osborne arrived at Bergstrom early the next morning. His airplane was ready for him, and he took off for George AFB within minutes, still wearing his civilian clothes! He was dog-tired when he caught up with Major Burns and the rest of the 522nd, which had been delayed at George by weather.

Osborne was in the second wave of eight primary and two spares which departed from George AFB for Hawaii on the 9th. Ground and air aborts reduced their number to seven as they left Hawaii for Guam on the 10th. The deployment continued to be eventful for Osborne. While 'sitting' on the tanker, awaiting the signal to drop off after in-flight refueling, one of his 450 gallon external tanks ruptured. Rather than abort and land at Midway, he decided to press on by climbing much higher than the others to stretch his fuel. Eventually he punched his empty external tanks off at 45,000ft. He still remembers how dark and lonely it was, all by himself with only a compass and radar to navigate with. Only squadron commanders and selected flight leaders had the ARN-59, which was used to home on commercial radio stations, and had a range of up to 900 miles. It provided flight leaders with a valuable navigational tool, since experience had shown that the navigation of supporting tankers and 'Duckbutt' rescue forces were sometimes less than perfect. Osborne joined up with the others over Guam, with enough fuel left to make a low pass over the field before landing.

The flight was eventful for one of the others too. One of the smokers was enjoying a cigarette while refueling at 15,000 feet over Midway — enjoying it until he dropped it into an inaccessible corner of the cockpit! In the natural order of small mistakes that are turned into disasters by circumstances, he detected the unmistakable odor of fuel fumes at that moment. He immediately moved out and away from the others, so that when he became a fireball he wouldn't take anyone with him (he was sure this cigarette was going to be his last). Fortunately, there was no fire, and he mended his ways after that. It was not uncommon for heavy smokers to light up while refueling from a tanker, which flew their tracks at 15,000ft. The lower altitude allowed the fighter pilots to remove their oxygen masks while refueling. However, refueling was most definitely a two handed operation, and trying to handle a cigarette simultaneously was asking for trouble, since it was not uncommon for the cockpit to fill with fuel fumes, which under ordinary circumstances was nothing more than an irritant to the eyes.

The primary purpose of this Pacific deployment was to provide a show of force in support of the Nationalist Chinese during the Formosa Crisis. Unfortunately, only thirteen of nineteen airplanes that departed George reached their destination of Kadena AB, Okinawa. An abnormally high number of problems with hydraulic systems and external fuel tanks that wouldn't feed caused most of the aborts, all of which were successful. The 'Fighting 101s' that did reach Kadena, stood fully armed 'cockpit alerts', and flew practice missions.

Practice missions to Formosa were an enlightening exercise. It had been suggested that the wide turning Voodoos would be vulnerable to attack by air-to-air missiles with a range of three to five miles. Major Burns proposed high speed (Mach 1.2 and above) hit and run tactics for his 'Fighting 101s', and adding an air-to-air missile capability which would keep opponents out of close in dogfighting range. Long range missile firing capability would be complemented by APG-37 search radar, which had a fighter type detection range of six to seven miles and a lock-on capability of four to five miles. He also suggested a radar tail warning device to protect the relatively blind six o'clock position. Burns acquired an AIM-9 Sidewinder from the US Navy

carrier Ticonderoga and test-fired it from his specially modified F-101C (56-0027a) on 25 November. The firing was successful, but no further tests were conducted. Still, the pilots kept busy. Thunderstorms and a typhoon gave the 522nd plenty of opportunity to practice radar navigation and bombing in weather, while those on "cockpit alert" sat on the ground, waiting.

The 522nd was more than ready to go home when they received the 'Eastward Ho!' notice on 8 December. Many of the maintenance men had been working up to 15 hours a day providing abnormally high F-101 'in commission' rates to support the heavy flying schedules. The only incident to seriously mar the flight home was faulty tanker navigation, which left them short of fuel on the leg from Hickam AB, Hawaii, to George AFB, California. They were forced to jettison their empty external tanks to reduce drag, climb to altitude, and cut across a restricted area — which caused much gnashing of teeth in the Air Route Traffic Control Centers. The thirteen 522nd F-101s were quickly dispatched to Hill AFB, where brand new TACAN receivers were installed. (TACAN incorporates the omni-directional range navigational system which has been the standard radio navigation system in this country for the past thirty years, with Distance Measuring Equipment DME.) TACAN provided a reliably precise navigational capability never before possible, and one which would be absolutely essential to operating in the crummy weather of Europe.

During eighteen months of flying the Voodoo, the 27th Tactical Fighter Wing transitioned from F-84Fs and became combat ready in the 'Fighting 101', set several speed records, participated in TAC weapons competition, deployed a squadron to Okinawa, helped the 81st TFW transition to the 101, then ferried their airplanes to England. They flew 21,423 hours without a fatal accident, and both losses they did have were the result of equipment malfunctions. One of the finest fighter wings ever assembled was now broken up in a 'cost-effective' move, shifting the 'Fighting 101s' to England. The 27th had been a closely-knit unit of veteran pilots and ground crew, working together as a team. As Lt Col George Kelley recalls; "We worked hard, and we played hard!"

A then-Captain Kelley was one of thirty-seven pilots from the 27th TFW who were selected to join the 81st TFW in England. Several of them deployed early to take the place of 81st pilots who had TDYed to Bergstrom and George to check out in the 101. For the former 27th pilots it was an exercise in Deja-Vu, as they stood alert in 81st TFW F-84Fs. Fifty-one 81st pilots checked out in the F-101 at Bergstrom and George during the fall of 1958. It was an accelerated program, and most of them had less than fifty hours in the voodoo when they took off from Shaw AFB and flew across the Atlantic to Nouasseur AB, Morocco by way of Lajes, Azores. Nouasseur was chosen to assure them of good weather for landings during this mid-winter deployment. One airplane was heavily damaged at Lajes when the pilot ran out of fuel and attempted to make an emergency landing without power. Forty-nine of the 27th's F-101s were ferried across in sections of eight during December of 1958, and nineteen followed in January. The thirteen 522nd airplanes which were undergoing Inspect And Repair As Needed (IRAN) and receiving the new TACAN receivers at Hill AFB, followed as they became available.

The 81st TFW was composed of the 78th Tactical Fighter Squadron 'Bushmasters' at RAF Woodbridge, and the 91st TFS 'Blue Streaks' and 92nd TFS 'Avengers' at RAF Bentwaters. Each squadron operated a mixture of A and C model Fighting 101s, side by side. Their primary mission was maintaining a deterrent alert force, prepared to deliver their 'nukes' at anytime of day or night, in any kind of weather. Individual pilots came to know their targets well enough to be able to carry out their mission without the aid of maps!

England is infamous for its perennially poor weather, which makes instrument flying a way of life for much of the year. JJ Burns was one of the prime movers in molding the 81st into an all-weather radar bombing qualified unit. It was not uncommon for them to take off on instruments, fly to the Isle of Man, bomb a barge off the coast via radar, and return to base on instruments, all without ever having seen the ground!

A great deal of emphasis was placed on low level (500 to 1,000ft) radar navigation across Europe. Radar navigation required a pilot to fly time and distance, while correlating between his map and radar returns. Pilots laid out their missions by drawing lines on their maps to indicate course, then marking time lines. Most of them flew in multiples of 60 knots (i.e. 360, 420, 480, 540, 600, etc.), or an exact number of nautical miles per minute to facilitate mental calculations. The time lines on the map were 6, 7, 8, 9, or 10 miles apart, and a pilot could tell where he was at any given time by referring to his watch — that is, providing he maintained the proper ground speed and heading. Radar was used to identify prominent topographical features and verify the time and distance navigation.

Maintaining the proper altitude was another difficult challenge. Many pilots were afraid of their autopilots and chose to hand fly while flying low level missions. At least one pilot was killed when his autopilot pitched the airplane down into the North Sea during a low level mission. Most pilots flew with nose-up trim, using forward pressure on the stick to maintain level flight. This way, if a pilot relaxed, or his attention was diverted while reading a map, the airplane would climb, rather than dive to oblivion. These missions required total pilot concentration on navigation — so much so, in fact, that one pilot lost an engine but didn't realize it until he started his climb out at the end of the route!

The all-weather, low level radar navigation strike role was a 'developed mission' — one for which the aircraft was never intended. It required a high degree of pilot proficiency and was extremely hazardous. Several 81st Voodoos were saved from almost certain loss by pilots who were proficient enough with their radars to recognize RAF Bentwaters on the screen, and land their aircraft after their radios had failed. Radio failure was not uncommon, and radar landing procedure was practiced whenever pilots returned from a mission with adequate fuel.

Most mission profiles called for low level (50 feet or less!) navigation to targets with a LABS or LADD weapons delivery. Both systems incorporated a series of gyros, timers, and computers which combined known factors with onboard computed variables to determine when a bomb should be dropped, then automatically released it. The key to this system was having an initial

During 1960 most 81st TFW 'Fighting 101s' were marked like this F-101C-35-MC of the 92nd TFS. Wing colors were: 91st Blue, 92nd Yellow, and 78th Red. With the protective tape removed the large size of the 20mm gun ports can readily be seen. (George Pennick)

point or Timer Reference Point (TRP) which was a known distance from the target. The pilot plugged this data into the computer along with his anticipated speed and altitude, activated the system over the TRP, and waited for the light in his gunsight to go off. He then pulled 3.5gs to a 45 degree, wings-level climb. The weapon was released automatically, and the pilot pulled on through the top of a loop, rolling level on top in an 'Immelman' escape maneuver. Col Harry Barco recalls that; "We went in at 560 knots, did a 3.5g pull, rolled out at 13,000ft, while the bomb went on up to about 25,000ft before starting back down."

The 'Fighting 101' had a theoretical LABS circular error average (CEA) of 200ft, but winds aloft were a big factor because of the extreme height and duration of the bomb's trajectory. The 81st had it's share of 'shacks' (a LABS bullseye if scored on the first run of the day). To a much greater degree than in horseshoes or hand grenades, being close with a multi-megaton nuclear weapon would have accomplished the purpose of most strike missions.

The LADD technique superseded the LABS method when tactical drogued weapons became available in 1962. The LADD method improved bombing accuracy significantly. The most incredible aspect of the LABS/LADD delivery was the 'Immelman' escape maneuver. Prohibited in all other F-101 models, it was routinely performed on instruments at night, and in weather by 'Fighting 101' pilots.

The 'Fighting 101' was also equipped with an Mergenthaler Linotype Company M-1 Toss Bombing System (TBS), but it was not extensively used by the 81st. The M-1 TBS was 30lbs of Gyro, Pressure Transducer, Computer, and Control Box, which was coupled to the K-19 gunsight. The pilot simply lined up his target on the crosshairs and activated the system by pushing a 'pickle' button. He pulled up in a wings level attitude, and his bomb was released automatically by the M-1 system. Using the Toss Bomb System the pilot did not need a TRP, and could approach his target from any angle between seven and seventy-five degrees and could pull up to 6.5gs during the escape maneuver. It was effective between 2,000 and 20,000ft, which unfortunately, precluded its use in Europe, where low level flying was the name of the game.

Although nuclear strike was the primary mission of the 81st, they did practice air combat maneuvering, but rarely, if ever, conducted aerial gunnery. They maintained air-to-ground strafing qualifications, probably more to fill squares than as a practical exercise. The airplane was not a good gunnery platform, and the seldom used 20mm cannons were poorly maintained, making it very difficult for some of the pilots to qualify. As a result, some of them had a tendency to press their strafing runs below prescribed limits. Lt Col Burns quickly broke his pilots of this habit by having full loads of tracers in the guns. Flying through wildly ricocheting tracers graphically illustrated the hazards of low level strafing. One time was all it ever took...

F-101C-50-MC of the 81st TFW. The composite markings on the tail were adopted in 1962 with the advent of centralized maintenance; colors from top to bottom are Blue, Yellow, and Red. (Douglas D Olson)

A great deal of the success which was attained by the 81st FBW was directly attributable to the quality and experience levels of assigned personnel. Between December 1958 and January 1966, 81st F-101s logged over 150,000 hours. Even so, European weather and tough missions took their toll, twenty aircraft and several pilots were lost in over 30 major accidents. During the fall of 1965, as the experienced pilots were being reassigned to Southeast Asia, the McDonnell F-101 Voodoo was being replaced by two seat McDonnell F-4C Phantom IIs. The surviving 101s were returned to the United States for modification to daylight photo reconnaissance aircraft.

RF-101G and RF-101H

Sixty-three of the remaining 'Fighting 101s', twenty-nine F-101As and thirty-four F-101Cs, were assigned to Tactical Reconnaissance units of the Air National Guard in Arkansas (154th TRS), Kentucky (123rd TRW, 165th TRS), and Nevada (192nd TRS). Twenty-nine F-101As were to be modified into low-level, VFR reconnaissance airplanes under the designation RF-101G and thirty-two F-101Cs (two were lost prior to modification) were to be similarly modified under the designation RF-101H. About half of them were modified by Lockheed, with the remainder being done by civilian technicians at McClelland AFB, California in order to speed up the process. The 'Fighting 101s' were in the midst of being converted to the reconnaissance role when President Johnson activated the three National Guard reconnaissance units on 28 January 1968 in response to the North Korean capture of the Pueblo. It was perhaps symbolic of Johnson's empty gesture that none of the 101s had even been equipped with photo gear when activation came!

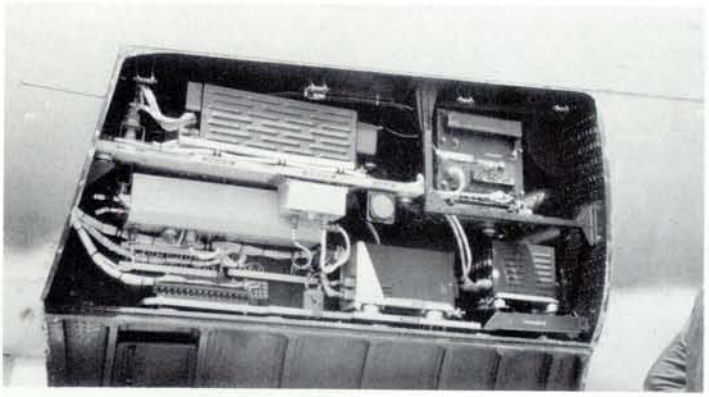
Each unit remained at its home station until June, when Arkansas (154th TRS) deployed twenty RF-101Gs to Itazuke AB, Japan, while Kentucky and Nevada moved to Richards-Gebaur AFB, Missouri and set up shop. Nevada (192nd TRS) took over at Itazuke AB during November, with Arkansas returning home and standing down in December. Kentucky (123rd TRW, 165th TRS) replaced Nevada at Itazuke during January of 1969 and remained there until April. In May, both the 123rd TRW, 165th TRS of Kentucky and 152nd TRS of Nevada returned to their home bases, being released from active duty on 9 June 1969. The entire 123rd TRW received an Outstanding Unit Award for their performance during their active duty. In addition the 152nd Group (192nd TRS of Nevada and Kentucky's 123rd TRW, 165th TRS) also received commendation plaques from 5th Air Force Commander Lt Gen Thomas K McGehee for their support of his command in Japan and Korea.

The Louisville based 123rd TRW flew 11,561 sorties,logging 19,715 hours during their active duty tour which included a three month deployment to Howard AB, Canal Zone, and a five month deployment to Elmendorf AFB,

(Above) The last two digits of the serial number were applied in White on the tails of most active duty RF-101Gs and Hs during 1968, 'USAF' and the serial number were painted in smaller black characters. This RF-101H (56-0026a) is at Nellis AFB, 13 March 1968. The O preceding the serial number identified the aircraft as being at least ten years old. (Douglas D Olson)

Alaska. During 1971 Nevada transitioned into twenty-two newly modified RF-101Bs and relinquished their RF-101Hs to Kentucky. Kentucky transferred their RF-101Gs to Arkansas, concentrating all RF-101Gs at Little Rock and RF-101Hs at Louisville. Both units acquired RF-101Cs during 1972, with the RF-101Gs and Hs being sent to Davis Monthan for salvage. It has been suggested that the 'Fighting 101' was something less than successful. Perhaps this is the case, however, before judgement is passed it should be pointed out that the 'Fighting 101's' design was begun in 1946 and it remained in active service from 1957 to 1972, fifteen years!

(Right) The RF-101H avionics bay was located on the lower fuselage just in front of the air intake. The access panel opened downward.



(Below) Six former Kentucky Air Guard RF-101G/Hs were deployed to Elmendorf AFB Alaska during their 1968 active duty stint precipitated by the USS Pueblo hijacking. These aircraft do not carry the White digits normally found on Gs and Hs. (21 August 1968 Norman E Taylor)

RF-101 RECONNAISSANCE VOODOO

RF-101As at McDonnell's Lambert Field facility shortly after completion. The drag chute compartment cover is open as it usually was when the Voodoo was on the ground. These RF-101s carry a pair of off-center belly mounted 450 gallon drop tanks. (McDonnell)

McDonnell had conducted feasibility studies on interchangeable mission noses during the F-88 program in response to a USAF request for a basic airframe which could be field modified to perform fighter, photo reconnaissance, or interceptor missions by exchanging noses. Early in the F-101 program USAF contracted for a photo reconnaissance version of the Voodoo that was capable of carrying 'special weapons'. The 'interchangeable' nose concept was given serious consideration from June of 1952 until 13 January 1954 when the project officer decided to use thirty-six inch focal length KA-1 cameras in the reconnaissance version of the Voodoo. The KA-1 cameras were too long to install in an interchageable nose, effectively killing the whole idea. The camera resolution, combined with a May of 1953 decision to delete the 600 pound AN/APN-82 electronic navigation system as a weight savings measure would have a profound effect on pilot technique and the RF-101s ultimate mission profile.

RF-101A

On 11 October 1953 USAF issued a letter contract authorizing McDonnell to modify two incomplete F-101A airframes into YRF-101A prototypes. The first of which (54-149) was rolled out during May of 1955 with flight testing beginning on 30 June. By then the Korean War had ended and economy moves were sweeping through the Pentagon. Force reductions were imminent and responsibility for development of the RF-101A was switched from The Strategic Air Command, which was bowing out of the F-101 program entirely, to The Tactical Air Command, which engendered still further changes. TAC provided Air Materiel Command (AMC) with its operational requirements during July of 1956. On 8 August AMC informed McDonnell of the changes required by TAC which called for additional avionics and the ability to carry a pair of ECM pods externally.

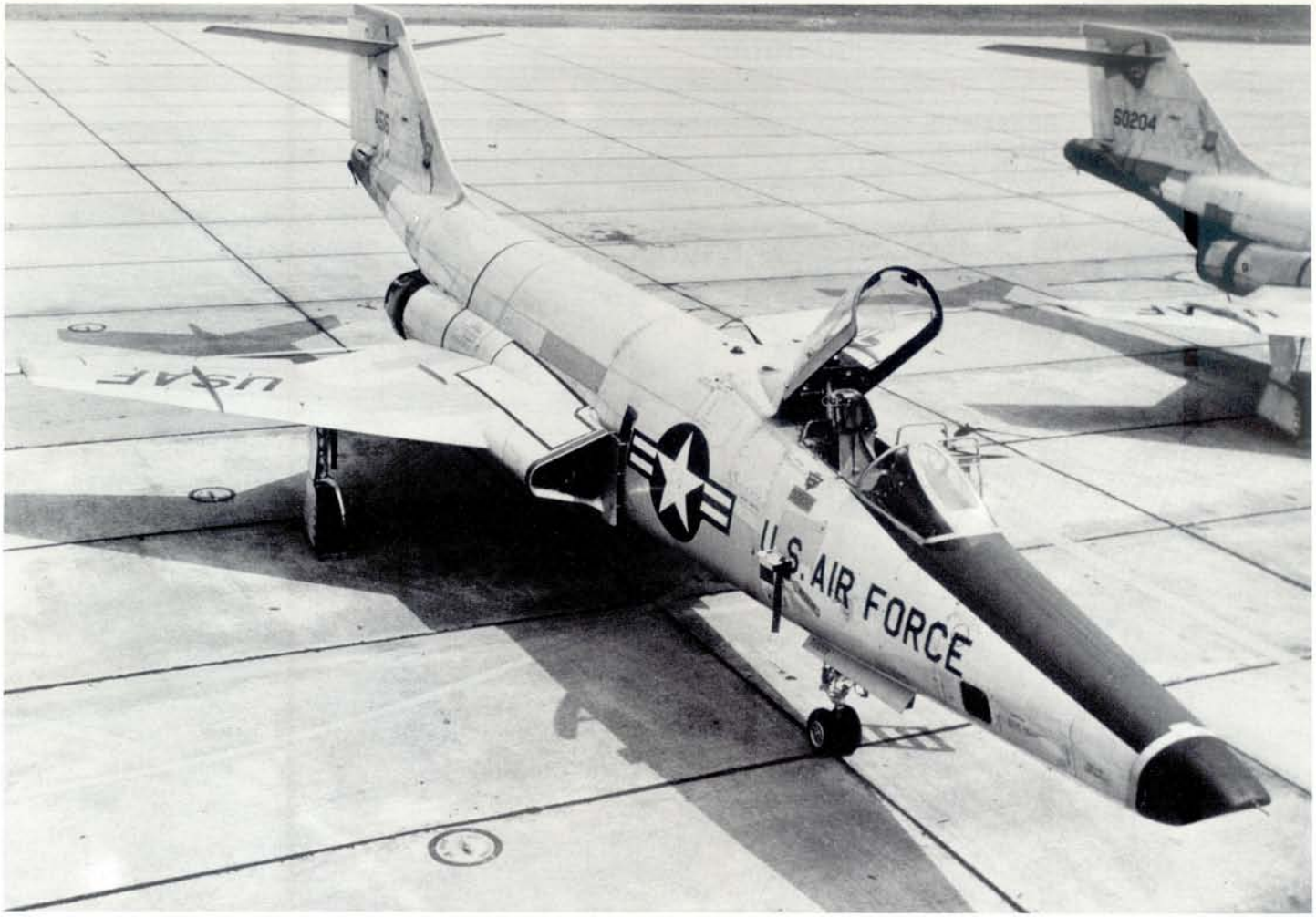
Although RF-101 development was begun approximately eighteen months after the 'Fighting 101', RF-101A reconnaissance Voodoos entered operational service first, if only by a matter of days. The RF-101 had a lengthened wedge shaped nose which was to carry the battery of cameras. However, the camera equipment was not ready when the first RF-101A was delivered to Shaw AFB, South Carolina on 6 May 1957 and assigned to the 363rd Tactical Reconnaissance Wing.The 363rd TRW was made up of the 17th and 18th Tactical Reconnaissance Squadrons, and the 432nd Tactical Reconnaissance Group, which contained the 20th and 29th Tactical Reconnaissance Squadrons. Both the 363rd TRW and the 432nd TRG also had Douglas EB/RB-66 squadrons assigned to them until February of 1958, when the 432nd was elevated to Wing status and acquired sole control of all four RF-101 squadrons.

The ground crewmen at Shaw faced the same maintenance, supply, and logistical problems faced by the 27th SFW maintenance people at Bergstrom. However, in addition, the Shaw maintenance people were saddled with the additional problems engendered by government supplied cameras and camera controls. In fact, most of the RF-101s were delivered to the squadrons without camera equipment! Their efforts to become operational were also hampered by runway repairs at Shaw, which necessitated operating from an auxiliary field several miles away.

RF-101s were designed to carry a variety of photo equipment, which could be operated automatically or manually. Most were originally equipped with one twelve inch focal length Fairchild KA-2 camera shooting forward through the wedge shaped nose, three six inch focal length KA-2s in a forward tri-camera station shooting downward through windows, and a pair of big thirty-six inch focal length Fairchild KA-1s located in the fuselage also shooting downward through windows. The KA-2s had a 9 X 9 inch format and the KA-1s had a 9 X 18 inch format, both of which provided high quality results. A VF-31 viewfinder provided the pilot with a view of what could be seen by the tri-camera station. Night photography was conducted by using seven inch focal length K-46 cameras in the tri-camera station and adding flare ejectors.

RF-101C

After thirty-five RF-101As were produced they were replaced on the production line by the structurally beefed up RF-101C which would become the



principal TAC reconnaissance fighter for several years, eventually equipping eight squadrons in the United States (USAF), the Pacific (PACAF) and Europe (USAFE). Seventy RF-101Cs (56-162 to 56-231) were produced on the basis of the original contract issued in March of 1956 and an additional ninety-six RF-101Cs were procured by the simple expediency of producing the last F-101Cs as RF-101Cs (56-40 to 56-135). The RF-101C was flown for the first time on 12 July 1957 with production aircraft being delivered to the 432nd TRG's 20th and 29th squadrons at Shaw by the end of the year. Essentially the same as the earlier RF-101A series the RF-101C was beset by the same early equipment shortages and teething problems as its predecessor.

1957 was the golden anniversary year for USAF, and they were anxious to demonstrate how far they had come in fifty years. Only six months after the first RF-101A had been delivered to Shaw AFB, Headquarters USAF directed the Tactical Air Command to use them in establishing new west to east, east to west and round trip transcontinental speed records. McDonnell used its expertise and computers to develop optimum performance profiles for the flights. These record efforts were dubbed SUN RUN by planners with hopes that the RF-101A could match, or beat, the sun's time transcontinentally.

Major Stanley R Sebring, CO of the 18th TRS, was appointed SUN RUN operations officer, and named six highly qualified reconnaissance pilots to conduct the operation. They deployed to George AFB, California on 14 October, with six 18th TRS RF-101As and 30 volunteer maintenance men. Since one of the critical features of the mission was in-flight refueling, they began practicing with brand-new SAC KC-135 tankers. As the pilots became familiar with refueling procedures the emphasis began to shift to the basic flight profile, and trying to improve on it for more speed and range from each load of fuel. McDonnell's flight profile called for a maximum power afterburner takeoff and climb out from Ontario International Airport. After levelling off at 45,000ft, the Voodoos would accelerate to near maximum speeds before throttling back to minimum continuous afterburning, which would keep them supersonic. Staying at 45,000ft, they would gradually accelerate as fuel loads were burned down. Each load of fuel provided approximately twenty-seven minutes of afterburning flight before a high speed descent to 35,000ft, where they slowed to .8 Mach for refuelling. After refuelling, they dropped off the tanker, flew along with the tanker for a few minutes, then with topped off tanks they headed for 45,000ft again. Four eastbound refuelings were conducted over one hundred nautical mile tracks,

RF-101As were externally similar to the RF-101C, but were structurally not as strong, lacked the ECM capability of the later model, and were not modified to carry 'special weapons' (nuclear). (USAF)

while the four westbound tracks were reduced to eighty nautical miles.

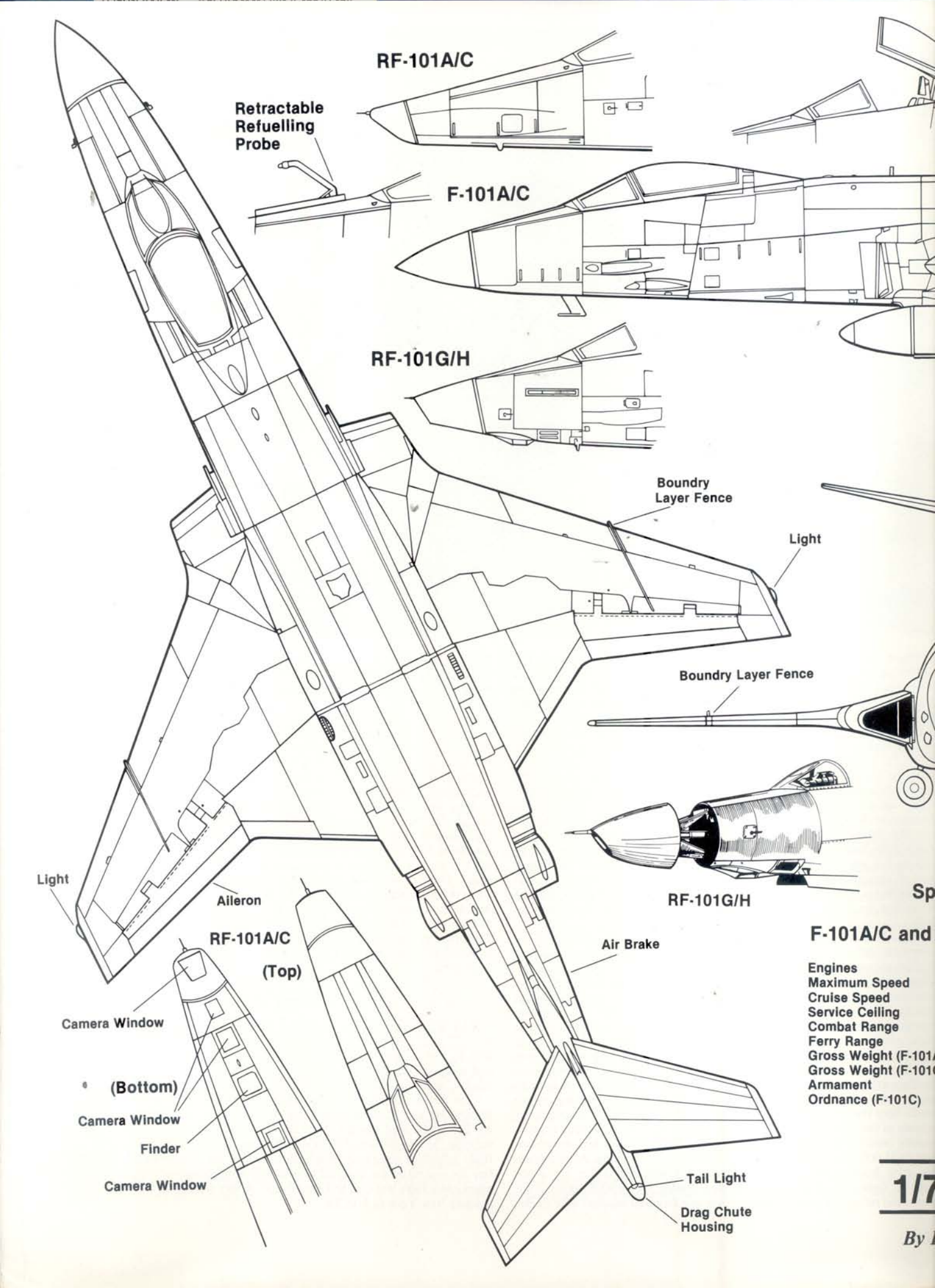
During October and November of 1957 the six RF-101As were replaced by six factory fresh RF-101Cs carrying special markings for easy identification by the timers at Ontario IAP and NAS Floyd Bennett, New York. The RF-101Cs were stressed for heavier loads and had improved fuel systems. More importantly, afterburner time was restricted only by fuel quantity.

After weeks of intensive flying out of George AFB, the RF-101Cs were deployed to Ontario International Airport with OPERATION SUN RUN being scheduled for 27 November 1957. Two waves of three airplanes were scheduled one hour apart. Each element consisted of a round trip pilot taking off five minutes ahead of a one way pilot, and ten minutes ahead of their spare. The first wave was made up of Captain Ray W Schrecengost (18th TRS) the pathfinder, Captain Robert J Kilpatrick (17th TRS) making the one way dash to New York, and Captain Donald D Hawkins (17th TRS) serving as their spare. They were to be followed by Captain Robert M Sweet (17th TRS) making the round trip bid with Lieutenant Gustav B Klatt (18th TRS) sprinting to New York and Captain Robert E Burkhart (18th TRS) acting as their spare.

First Wave

SUN RUN came off as scheduled. Capt Ray Schrecengost took off at 0659.57 and flew to Floyd Bennett in 3:15.41, returning to Ontario in 4:01.26, for a round-trip time of 7:17.07. He was slowed by fuel problems and inexperienced controllers in the east. He followed the basic profile, but climbed as high as 49,000ft in an effort to save fuel.

Capt Robert Kilpatrick blasted off at 0705.29 and flew a slightly modified profile. He elected to go supersonic in the area of 38-39,000ft, where the RF-101 accelerated quickly, then drift-climbed to 44 or 45,000ft. Unfortunately, he lost the use of his wing fuel, and to make matters worse, his in-flight refuelling equipment malfunctioned. He was forced down to 14,000 feet for one refuelling and had to manually rendezvous with another tanker when controllers lost him and the tanker! A very frustrated Capt Kilpatrick reached New York in 3:11.39.



F-101A/C and

Engines	
Maximum Speed	
Cruise Speed	
Service Ceiling	
Combat Range	
Ferry Range	
Gross Weight (F-101	
Gross Weight (F-101	
Armament	
Ordnance (F-101C)	

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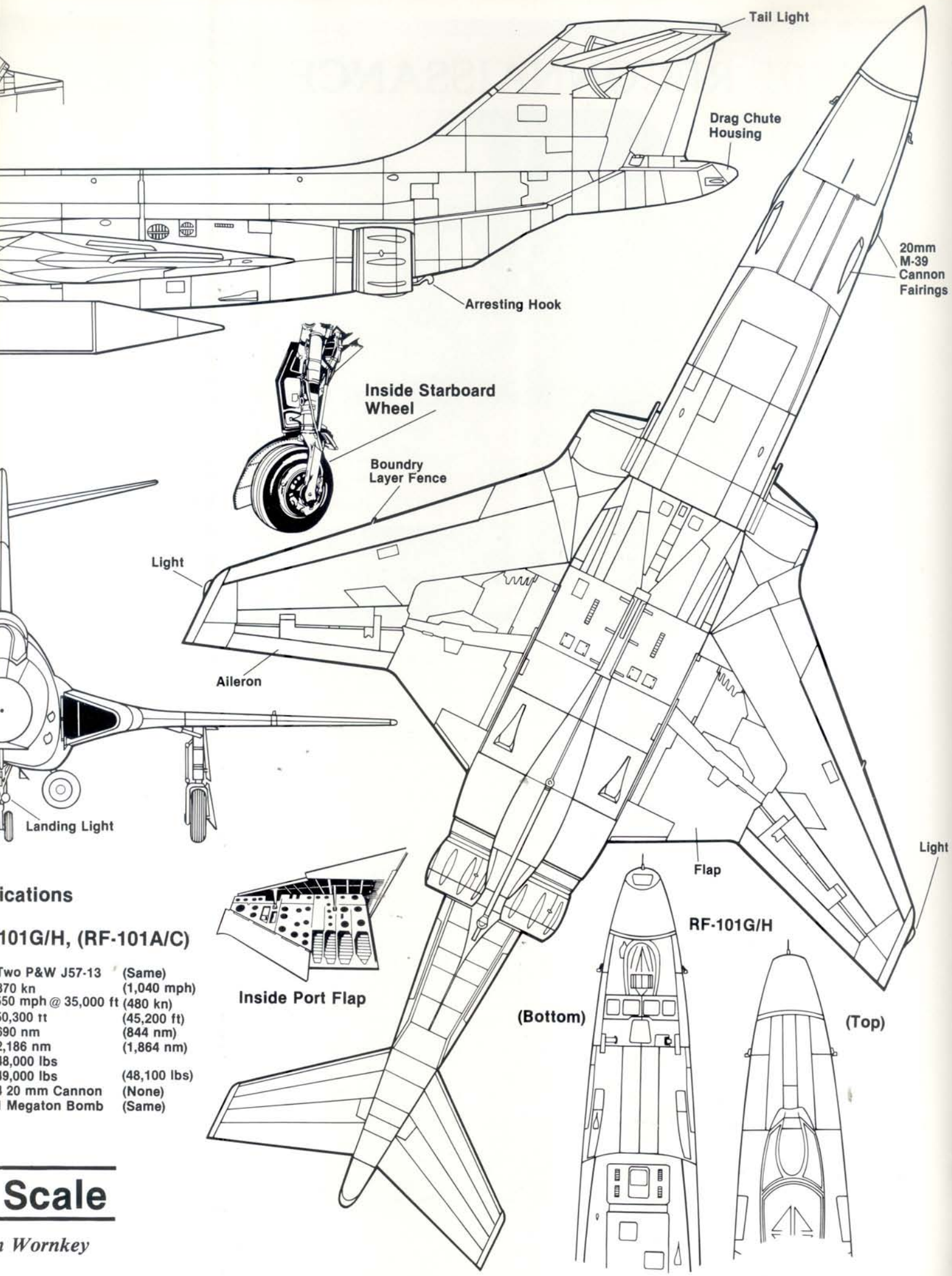


ications

101G/H, (RF-101A/C)

Two P&W J57-13	(Same)
370 kn	(1,040 mph)
550 mph @ 35,000 ft	(480 kn)
50,300 ft	(45,200 ft)
590 nm	(844 nm)
2,186 nm	(1,864 nm)
48,000 lbs	
49,000 lbs	(48,100 lbs)
4 20 mm Cannon	(None)
1 Megaton Bomb	(Same)

Scale

n Wornkey

Capt Don Hawkins, the First Wave spare, took off from Ontario at 0719.15, and recorded the best time of all participants to the first tanker. Although Schrecengost and Kilpatrick might have been justified in aborting, the competitive fires that had resulted in their selection in the first place kept them going, and while Hawkins had to turn back. He did play an important role in developing the modified profile which was used by both Kilpatrick and Sweet.

The Second Wave

Capt Robert Sweet took off at 0750:38. He went supersonic at 35,000ft, climbed to 45,000ft at a shallower angle than the profile called for, and then drift-climbed to 49,000ft. A combination of pilot technique, skill, luck, and an airplane that ran like a jewel helped Sweet to establish new east to west and round trip records of 3:36.32 and 6:46.36, respectively. His profile helped him reach each tanker with a safe margin of fuel and the only problem he encountered was a compass malfunction. An alert air controller quickly alerted Sweet to the resulting error in navigation and he switched to the standby compass quickly solving the problem.

Lt Gustav B Klatt at 29, was the youngest competitor, but he posted the best time to New York. His 3:07.43 flight was made at an average speed of 781.7409 mph, approximately 26 mph slower than the sun time planners had sought. Higher than anticipated temperatures at altitude and lower west to east tail winds than expected had reduced the speed to New York. Klatt followed the basic McDonnell mission profile, but stayed in burner by approximately 600 pounds of fuel longer on each leg of the flight than was recommended. He plugged into the last tanker with less than 500 pounds of fuel remaining after controllers had positioned his tanker improperly.

Captain Robert E Burkhart, the second wave spare, took off from Ontario at 0811:12. He raced to the first tanker, then took on enough fuel to make the lonesome flight to March AFB after learning that his services were not required.

Excellent resolution and clarity were hallmarks of RF-101 photography. (USAF)

OPERATION SUN RUN was a large and complex mission which was well planned and executed by airmen pushing both their skills and aircraft to, and perhaps beyond, realistic limits. Each of the participants strongly felt that they could have done considerably better if given another opportunity. A three hour west to east sprint was undoubtedly attainable but a six hour round trip was probably out of reach for the RF-101C. The use of squadron airplane drivers, flying stock and fully loaded RF-101Cs made OPERATION SUN RUN doubly significant. The pilots continued their highly successful military careers and the RF-101s saw extensive service. Captain Schrecengost's airplane (56-166) was retired to the Air Force Museum after 6,604.9 flying hours, and hundreds of combat missions in Vietnam.

Captain Martin J Barnard, who had delivered the first RF-101 to Shaw AFB, also led the first deployment of Voodoos outside of the United States in November of 1957, fully ten months before the 522nd TFS took their 'Fighting 101s' to Guam. OPERATION MOBILE ZEBRA was a test of the Composite Air Strike Force (CASF) mobility concept, and provided operational experience for the forces involved as well as demonstrating the Voodoo to PACAF members. Six RF-101As island hopped across the Pacific to Japan via Hawaii, Guam, the Philippines, and Okinawa. The 3,850 mile return flight from Tokyo to Hawaii was flown in a record six hours and thirty-five minutes.

Mobility was not a new concept. TAC had developed a well organized Composite Air Strike Force, consisting of North American F-100 fighters, Douglas EB/RB-66 and McDonnell RF-101 reconnaissance aircraft, Boeing KB-50 tankers and Lockheed C-130 transport aircraft for support. Fly away kits with sufficient spare parts for several weeks of flying activities were constantly maintained along with ready travel bags for the aircrews and maintenance men. Pilots were taught to service their aircraft and perform minor maintenance work so that they could fly missions before their support forces caught up with them. It was not uncommon for aircrewmen to report for duty in the morning and be deployed for weeks or even months before

The standard RF-101 configuration frequently included a pair of 450 gallon belly mounted drop tanks as being carried on these 20th TRS RF-101Cs during a stop at Myrtle Beach AFB, SC. The emblem of the 20th TRS is carried on the nose. (USAF via Norman E Taylor)

RF-101s provided vital photography during OPERATION BLUE BAT providing support for the Lebanon peacekeeping operation in 1958. The first Voodoo hit by hostile fire occurred during a low level flight over a Lebanese beach. (USAF)

returning home! Recce pilots frequently spent 200 or more days a year away from home. CASF mobility was limited more by tanker availability than anything else. The old KB-50 tankers absorbed terrible punishment from constant maximum power application, with their piston engines quickly becoming failure prone. Unfortunately, the old joke about 'three turning and one burning' was often true. The installation of auxiliary jet engines in the old tankers, however, gave them a new lease on life. Still, whenever possible, tanker operations were conducted within range of facilities that could accommodate fighters or recce birds in an emergency.

The first RF-101 CASF deployment in response to a world trouble spot was OPERATION BLUE BAT into the Middle East. Captain Ray Schrecengost took off from Shaw AFB with a flight of six RF-101s on the afternoon of 15 July 1958, headed for Chaumont AB, France. One aircraft developed a hydraulic problem and aborted. The five remaining aircraft continued, using DF steers and dead reckoning to navigate across the Atlantic toward the Azores. As it got dark, the navigation lights on three of the Voodoos failed. Schrecengost was unable to make radio contact with the promised tankers, (they failed to show up) and the five fuel exhausted RF-101s were forced to land at Lajes AB in a driving rainstorm. Life could be exciting in those days of USAF's pioneering efforts to develop a world-wide capability! The many hours spent practicing instrument flying in what was basically a VFR airplane often paid big dividends, since many deployments that took off in sunshine ended in total darkness after multiple night refuelings.

Captain Schrecengost and his flight took off from Lajes the next morning, flying to Wheelus AB, Libya with a refueling stop at Chaumont AB, France. Captain Robert Burkart blew a tire while taking off from Wheelus but continued on to their destination of Incirlik AB, Turkey, where he made an uneventful landing. During the weeks and months which followed, the recce airmen flew photo reconnaissance missions over Lebanon in support of US Marine peace keeping forces (it worked in those days). Lt Klatt gained the dubious distinction of piloting the first Voodoo to be struck by hostile fire, when he was hit while flying low over a Lebanese beach. The 101s returned to Shaw in October.

RF-101Cs returned to the Far East during 1958 in support of the Nationalist Chinese and were introduced to PACAF units during the spring of 1959, when the 15th TRS at Kadena AB, Okinawa, and the 45th TRS at Misawa AB, Japan transitioned from RF-84Fs into RF-101Cs. The reconnaissance units at Shaw AFB were reorganized in May of 1959. In May of 1958 the 17th and 18th Tactical Reconnaissance Squadrons had deployed to France, becoming part of the 66th Tactical Reconnaissance Wing. The 432nd TRW was deactivated with the 20th and 29th TRS again becoming part of the 363rd TRW. The 363rd TRW then organized the 4414th Combat Crew Training Squadron (CCTS) at Shaw to supply TAC, PACAF and USAFE units with Voodoo qualified pilots.

By mid-1959 the RF-101 fleet consisted of one training and eight operational reconnaissance squadrons, allocated as follows; USAF: 363rd TRW (20th, 29th and 4414th CCTS); USAFE: 66th TRW (17th, 18th, 32nd and 38th TRS); PACAF: 15th and 45th TRS.

The McDonnell RF-101 Voodoo was catapulted into national prominence by the Cuban Missile Crisis. President Kennedy ordered the Joint Chiefs of Staff to carry out low level reconnaissance flights over Cuba during the October of 1962 crisis. The President wanted detailed photos of the Soviet medium and intermediate range ballistic missile sites which had been discovered by high flying Lockheed U-2s. USAF RF-101C Voodoos and Navy F8U-1P Crusaders were chosen for the mission because it was felt they were the only types capable of operating in the SAM environment over Cuba.

The first flight of 363rd TRW 101s departed from Shaw exactly six hours after they were alerted, and in less than twelve hours the basic complement of wing aircraft were in place at MacDill AFB, Florida — ready to fly missions.

Admiral Robert L Dennison, Commanding Officer, Armed Forces Atlan-

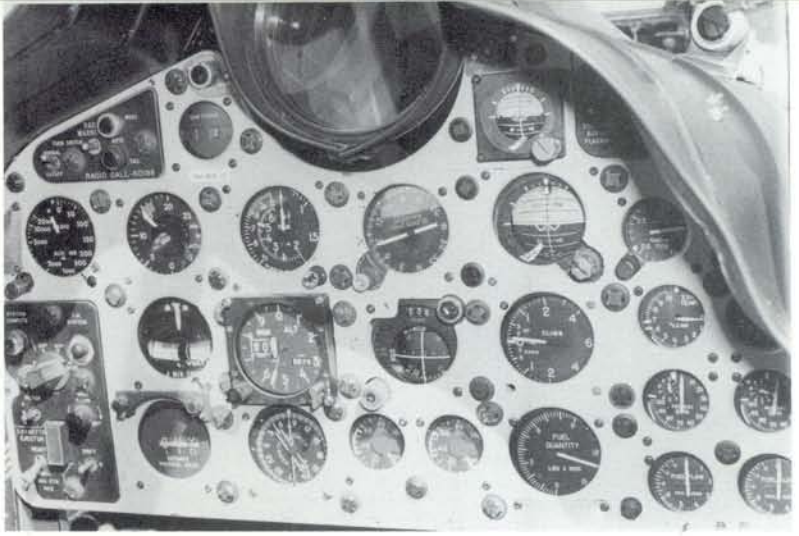
(Below) RF-101C of the 363rd TRW, which included the 20th TRS, the 29th TRS, and the 4414th CCTS. In response to Soviet missiles being found in Cuba, the 363rd TRW deployed RF-101s to McDill AFB, being ready to fly missions in less than twelve hours.

tic, was in charge of the Cuban blockade and aerial buildup in Florida. As a result, it was the Navy Crusaders which flew the first sixteen missions on the 23rd (6) and the 25th (10), while the 101 pilots sat cockpit alert, fuming and itching to fly. They finally got their chance on the 26th. Two 101s took off at 1030, followed by eight more during the balance of the day. On the 29th RF-101Cs flew six sorties. The initial missions were flown to document the presence of the missiles. The rest of the missions were used to build target folders on 110 potential military targets throughout Cuba. These missions were not unopposed. Cuban air defense forces knocked down a U-2 flown by USAF Major Rudolf Anderson with a SAM on the 27th. No Voodoos or Crusaders were shot down, though they encountered sporadic small arms fire.

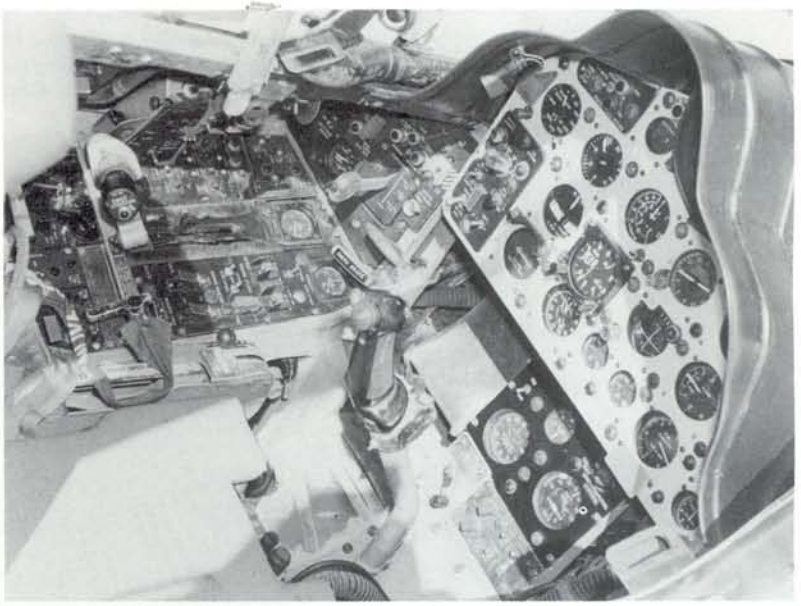
Soviet Premier Nikita Khruschev communicated his intent to dismantle and remove offensive weapons from Cuba to President Kennedy on the 28th. Reconnaissance flights made on the 29th illustrated mixed results, but subsequent flights indicated that the weapons were indeed being dismantled and removed. The ground fire ceased. Beginning on 1 November, daily reconnaissance flights were used to confirm the dismantling and withdrawal process while sea and air patrols followed the Soviet ships as they retreated to Russia with their missiles.

The Shaw airmen flew 240 hours, 108 sortie hours carrying out eighty-two Cuban reconnaissance overflights between October 26th and November 15th. They took 308 rolls of film which averaged approximately 200 exposures per roll. Some 39,594 contact prints and 297 enlargements were printed by technicians. All RF-101 sorties were flown at high speeds and most were made at altitudes ranging from 200 to 500ft in an effort to stay well below the effective operating capabilities of SA-2 SAM missiles. A typical mission would originate from MacDill AFB at Tampa, Florida, proceed toward their initial point (IP), Key West, at 20,000ft. They continued on from the IP at 420 knots, while descending to arrive over the target at low altitude. Most missions had two or more targets in the same general area. Aircraft were frequently tracked down to 200 feet over water by SAM radars, but no SAM missiles were fired at the Voodoos. After egress, the RF-101 would climb back to 20,000ft for the return flight. An average sortie would last an hour and forty-five minutes, but a few were longer and required tanker support. Technicians met the returning reconnaissance airplanes at MacDill, immediately downloaded the film, developed and printed it, then rushed it to Andrews AFB or Langley AFB aboard RB-66s. In at least six instances the RB-66s were bypassed and the RF-101s flew the film directly to Washington DC at high speed.

Most pilots got to fly only one or two Cuban overflights during the month long crisis. It was a very frustrating experience for most of the emotionally charged pilots, who simply wanted to fly. Many of the November missions took off with a spare which turned back at Key West or the air refueling point if he wasn't needed. The 363rd TRW was authorized a strength of thirty-two RF-101s and forty combat ready pilots. On 17 and 18 November there were forty-three RF-101s, of which thirty-six were fully operational, and forty-five eager pilots at MacDill. The 363rd had been



Instrument panel of RF-101C (56-198). The view finder is located at the top center of the panel.



(Above) Cockpit port side console and control stick of RF-101C (56-198). (Paul Stevens)

(Below) 18th TRS RF-101A cruise climbing, a method used to obtain optimum range. The Voodoo would climb to 33,000ft under military power, then slowly cruise climb to 48 or 49,000ft. Cruise climbing figured heavily in the flight profile during OPERATION SUN RUN, the coast to coast speed record attempt.

Brigadier General Stephen B Mack's RF-101A was marked with a representation of both the 363rd Wing and 432nd Group markings on the tail. He commanded both units at Shaw AFB. (USAF via Norman E Taylor)

(Above) One of the more unusual camouflage schemes tried the on RF-101s on an experimental basis during the early sixties at Shaw AFB, SC. (USAF)

(Below) RF-101C of the 363rd TRW landing at Shaw AFB, SC on 21 September 1968. (Jim Sullivan)

(Above) RF-101C of the 31st Tactical Reconnaissance Training Squadron (TRTS) landing at Shaw AFB during August of 1970. The 31st was originally designated the 4414th Combat Crew Training Squadron and was originally responsible for training all 'fighting 101' and RF-101 reconnaissance aircrews. When they became overloaded during the Vietnam War the 29th TRS took over advanced training and the 31st reverted back to transition training. (Jim Sullivan)

Refueling from KC-135s at 35,000ft was child's play compared to the same operation at 15,000ft with KB-50s. 29th TRS RF-101Cs from Shaw over Alaska during April of 1970. (Sgt George Holland via Norman E Taylor)

This USAFE RF-101C (56-0090a) carries markings of the 66th TRW during the early 1960s. From top to bottom, Red, White, Green, White, Yellow, White, and Dark Blue stripes bursting out of the 66th TRW insignia. (USAF)

augmented by instructor pilots and aircraft from the 4414th CCTS, and by four 'Toy Tiger' RF-101s that had been recalled from duty in Southeast Asia. These 'Toy Tiger' aircraft had been equipped with KA-45 cameras and electronic flash pods giving them limited night photo capability. The last four sorties were flown on 15 November. Ten aircraft were released from McDill on the 19th, and all but six of the rest were released at the end of the month. The last six were finally returned to Shaw on 14 December. Some routine training flights were conducted out of MacDill, but the 363rd TRW still flew only 5117 of their 5400 allocated hours during the second half of 1962.

President Kennedy was very pleased with the performance of his reconnaissance airmen and personally presented the 363rd TRW with an Outstanding Unit Award for their performance from 23 October to 26 November 1962. Sixteen RF-101 pilots were awarded the Distinguished Flying Cross for overflights conducted on 26 and 29 October.

Although pilots and ground crew performed admirably during the crisis, the affair clearly demonstrated the need for improved film, equipment and techniques. The reconnaissance community was shaken to its foundations, and extensive modifications were subsequently made to the RF-101C fleet. New facilities were established at Shaw for development and analysis of film.

Ironically, some of the pilots who had itched for the opportunity to fly combat over Cuba, and who were bitterly disappointed when they didn't get to fly several missions, would soon be overwhelmed with opportunities to put it all on the line — over Vietnam.

USAFE

European weather and crowded airspace over the continent combined to make it difficult for the 66th Tactical Reconnaissance Wing to transition from their RF-84Fs to RF-101Cs. As a result, the 32nd TRS was deployed to Nouasseur AB, Morocco, where they converted to the RF-101 between 21 August and 31 December 1958. The 38th TRS followed and was operational on the 101 when they returned to Phalsbourg AB, France, at the end of February. In May of 1959 the 32nd and 38th TRS were joined at Laon AB, by the 17th and 18th Tactical ReconnaissanceSquadrons, which deployed from Shaw as operational units with brand new RF-101Cs.

When it came to targets, Europe was a reconnaissance pilot's delight. Railroads, highways, bridges, tunnels, canals, streams, dams, and all manner of interesting landmarks made for continually fresh target folders. The terrain included flat farm lands, rolling hills, mountains, and valleys which gave the pilots a tremendous variety of practice targets and flying conditions. Low level was the name of the game in Europe, and routes which avoided heavily populated areas, airfields, and homes of political leaders were established to allow the recce types to practice down to 500ft at unlimited airspeeds.

Reconnaissance pilots were the premier navigators of Europe. They had to be in order to survive! Low level routes could become hazardous during the ever changeable European weather, but the real tests came during border patrols. Routine reconnaissance flights were flown along the borders of Soviet controlled countries in order to monitor any military buildup, or to keep an eye on regularly scheduled communist military maneuvers. During the mid to late fifties, Churchill's famous rhetorical 'Iron Curtain' was not the physical barrier it would become after the construction of the Berlin Wall, and reconnaissance pilots had to be careful not to stray over these sometimes ill defined borders. And the communists made navigation even tougher by erecting secondary border barriers and transmitting false radio signals in an attempt to lure unwary pilots across their borders. Once inside communist borders, USAFE aircraft were fair game and were often shot at or shot down within minutes. Between 1950 and 1964 108 US airmen were either killed or just disappeared without a trace along the Iron Curtain.

RF-101 border patrols were flown only by the most competent and experienced 66th TRW pilots. They used 1:250,000 maps for navigation, and were in constant radio contact with radar controllers in West Germany. The controllers monitored the flights, and provided MiG warnings. As a precaution against over zealous MiG pilots, who might be tempted to cross the border to get a kill, USAFE fighters were placed on a higher alert status while border reconnaissance missions were being carried out. TIME Magazine reported in its 20 March 1964 issue that MiGs had crossed into West Germany at least ninety-five times, and there are unconfirmed reports of at least one engagement between USAFE fighters and MiGs which attacked RF-101s during a border patrol. When the MiGs attacked, the F-101s went into tight afterburner turns to keep the MiGs off their tails, then departed the area at high speed as the US fighters arrived. Ironically, reconnaissance pilots were not allowed to view the side-oblique photos of the 'other side' that they had taken! During the 1961 Berlin crisis border patrols were flown in pairs, but again reverted to single aircraft missions as the crisis cooled.

Reconnaissance teams were allowed to participate in 'William Tell' for the first time in September of 1962. At that time 'William Tell' was TAC's worldwide weapons meet, held at Nellis AFB, Nevada. ('William Tell' has since been adopted by Air Defense Command, and is now held in alternate years at Tyndall AFB, Florida, while TAC's weapons meet is now called 'Gunsmoke' and is still held at Nellis, also on alternate years.) A special photo competition was structured as a part of William Tell, and USAFE's 66th TRW team, captained by Major Ray W Schrecengost scored 2267 of a possible 3000 points to outdistance PACAF (2006 points) and TAC (1717 points) teams. The USAFE team also included Captain Wesley J Brooks and 1/Lt Richard P Bultman. Captain Brooks was named the top reconnaissance

USAFE RF-101C on display alongside of a F-100 fighter during an early 60s airshow in Europe. Because of the constant threat of MiG attack USAFE fighters were kept on a higher alert status when the unarmed RF-101s were working along the borders of the Iron Curtain. (George M Miller)

(Above) Low altitude was the name of the game in Europe, with 66th TRW RF-101s screaming across much of Europe at 500 to 1,000ft at speeds of 420 to 480 knots. (USAF via Norman E Taylor)

pilot of the meet. Unfortunately, he lost his life in an RF-101 accident near Grenoble, France while practicing for a 'Royal Flush' meet in April of 1963.

'Royal Flush' is a yearly NATO competition featuring all types of tactical reconnaissance aircraft. RF-101s frequently had to compete against multi-seat RB-66s and Canberras in the medium range daylight categories. During the 1967 'Royal Flush XII' competition, the 18th TRS won overall daylight honors for the 66th TRW and USAFE. A team of twelve pilots, including several combat veterans, flew two missions per day and successfully photographed all three of their targets during each sortie. A total of seventy-two sorties were flown by the 18th during the three day competition without a single ground or air abort, covering all of their targets. Major Edward Satterfield led the American team with 2,046 points out of a possible 2,300.

The 66th was less mobile than the RF-101 units at Shaw or PACAF, but usually deployed to 'sun bases' in Africa at least twice a year during sustained periods of bad weather in Europe. Africa offered fine flying weather, but few good reconnaissance targets. An exception was the long lost WWII B-24, the 'Lady Be Good', which was discovered in the Libyan desert 350 miles south of Benghazi in November of 1958. Several RF-101 sorties were flown in support of ground search parties seeking an overland route to the crash site.

During the early sixties 66th TRW RF-101Cs were modified to carry nuclear weapons. But since France would not allow nuclear weapons to be stored on French soil, the 38th TRS moved to Ramstein AB, Germany during July of 1962, changing their mission profile to Strike/Reconnaissance. This dual mission created an overwhelming workload on the 38th TRS and eventually all 66th TRW pilots were checked out as 'Nuclear Aircraft Commanders'. Pilots from the 17th, 18th, and 32nd Squadrons rotated to Ramstein on a temporary basis and shared the alert duty. The dual role mission was successful, but the strike mission was discontinued as attrition reduced the worldwide fleet of RF-101s and ever increasing demands were placed on the remaining reconnaissance units and aircraft. The dual role mission had degraded reconnaissance capabilities, since pilots were forced to spend a great deal of time practicing delivery techniques and standing alert, and aircraft which had been modified for the strike role did not have an ECM capability, which would become necessary for reconnaissance survival in Southeast Asia.

Operational attrition and combat losses in Southeast Asia rapidly depleted the RF-101 fleet, bringing to an end RF-101 operations in USAFE in 1970, when all units converted to RF-4C Phantom IIs. When the 66th phased out RF-101 operations most of their RF-101Cs were reassigned as trainers to Shaw AFB until new ECM gear could be installed.

(Below) USAFE film technicians downloading film at Ramstein AB Germany. An experienced ground crew could completely download an RF-101 in a matter of minutes.

Patch applied to participants in the 6th Annual Royal Flush European reconnaissance tournament.

(Above) A1/C Roger Laliberte of the 837th Air Division Tactical Reconnaissance Team from Shaw AFB attaches a film magazine to the forward looking KA-2 camera during William Tell 62. Camera access panels opened up the whole nose providing ease of maintenance (USAF)

PACAF

Between August and November of 1958 forty brand new RF-101Cs were ferried to the 15th Tactical Reconnaissance Squadron at Kadena AB, Okinawa, and the 45th Tactical Reconnaissance Squadron at Misawa AB, Japan. Dubbed OPERATION FLYING FISH it was the first time one of the new 'Century Series' fighters had been ferried to overseas bases for service use. The first group of ten RF-101Cs included six Shaw based aircraft which were flown by instructor pilots who returned to Shaw after helping to check out Pacific Air Force (PACAF) pilots. Despite extensive civilian contract employee support provided by technicians from Hill AFB, these flights were plagued by external fuel tanks that would not feed, and by radio problems. One of the aircraft was lost along with it's pilot, only one-hundred miles short of Hawaii due to fuel exhaustion. The pilot had broken the refueling probe off when he hit the tanker too hard. And while the accident was officially charged to 'pilot error', it resulted in much improved flexible probes being developed and installed on all RF-101s.

Regardless of these problems the 15th 'Cotton Pickers' TRS and the 45th 'Polka Dots' quickly transitioned into their new aircraft and developed into top notch RF-101 outfits. Both squadrons earned Flying Safety awards, Outstanding Unit Awards, and the 45th won a Columbian Trophy. The safety awards were especially noteworthy, since a great deal of their flying was done over water, while deploying to Korea and/or the Philippines in search of reconnaissance targets.

Both the 15th TRS and 45th TRS were based close to the ocean, which began to cause serious corrosion problems. Several RF-101Cs had to have new wings because of wing skin deterioration caused by the salt air. Eventually, jigs were developed which allowed technicians to re-skin the wings without distorting their critical contours. Some repair work could be done in the field by Air Force personnel assisted by civilian technicians, but many PACAF RF-101Cs had to be returned to the States for the extensive reskinning work. A corrosion control facility was established at Kadena during 1963. PACAF airplanes were eventually painted Gray to help retard corrosion.

Formosa and the offshore islands of Quemoy and Matsu in the Formosa Straits were hotly contested political and military hotspots during this period. Nationalist China became the only foreign country to operate RF-101s when they acquired four RF-101As during October of 1959. These RF-101As were used to overfly Communist mainland China after February of 1960. The Chinese mainland overflights were a highly disciplined and successful intelligence program, known as OPERATION BOOM TOWN. Reportedly, American Intelligence Officers helped select the targets and assisted in planning these low level flights, but veteran Chinese pilots did the flying. Many of their targets were military airfields and port facilities along the coast. Aircraft range was the primary limiting factor to these missions. Several BOOM TOWN RF-101As were lost, but replacements were quickly dispatched and the overflights continued. The last documented loss occurred during March of 1965, but its unknown how much longer the flights continued. There are unconfirmed reports of RF-101s being supplied to Formosa as late as 1970. PACAF units helped support BOOM TOWN, but did not directly participate.

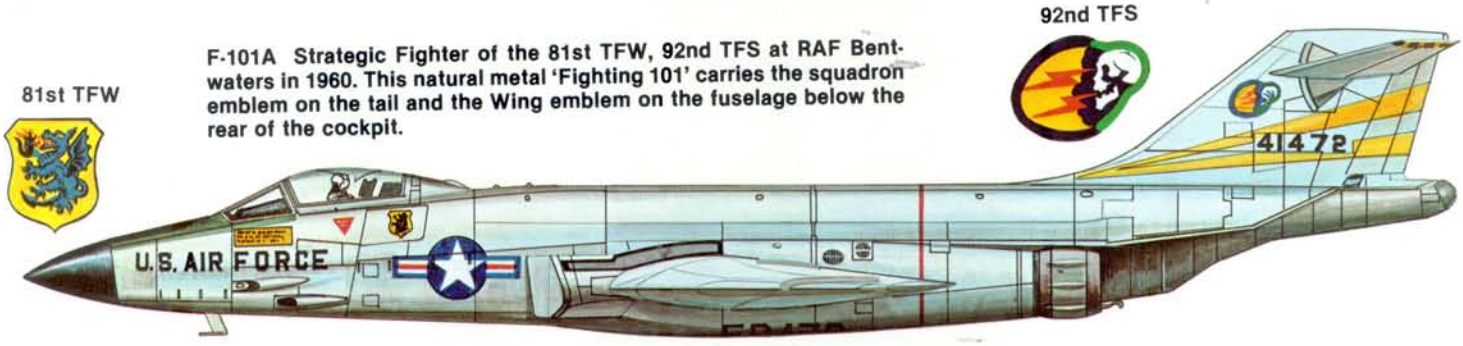
Pacific Air Force (PACAF) fighters refuel on a KB-50. Weak and inflexible refueling probes were the scourge of early Voodoo inflight refueling operations. (USAF)

'FIRE WALL', the F-101A in which Major Adrian Drew set the absolute world speed record of 1,207 MPH on 12 December 1957. This early 'Fighting 101' is equipped with elongated afterburner cans and rear engine mounted auxiliary air scoops that would later became standard on the F-101B.

81st TFW

92nd TFS

F-101A Strategic Fighter of the 81st TFW, 92nd TFS at RAF Bentwaters in 1960. This natural metal 'Fighting 101' carries the squadron emblem on the tail and the Wing emblem on the fuselage below the rear of the cockpit.



RF-101C belonging to the 29th Tactical Reconnaissance Squadron of the 432nd Tactical Reconnaissance Group at Shaw AFB, SC.

18th TRS

RF-101C, 'CIN MIN', was the number four 'SUN RUN' aircraft. It was flown by Capt Ray Schrecengost of the 18th TRS on the round trip transcontinental run and briefly held the record.

(Above) 45th TRS 'Polka Dot's' ground crewmen are shown downloading film 'on the run' during the 1962 William Tell Competition at Nellis AFB. Note their special white uniforms and spit shined boots, hallmarks of these competitions. (USAF)

(Below) RF-101C of the 45th TRS 'Polka Dots' at Misawa AB, Japan during October of 1967. (Norman E Taylor)

SOUTHEAST ASIA

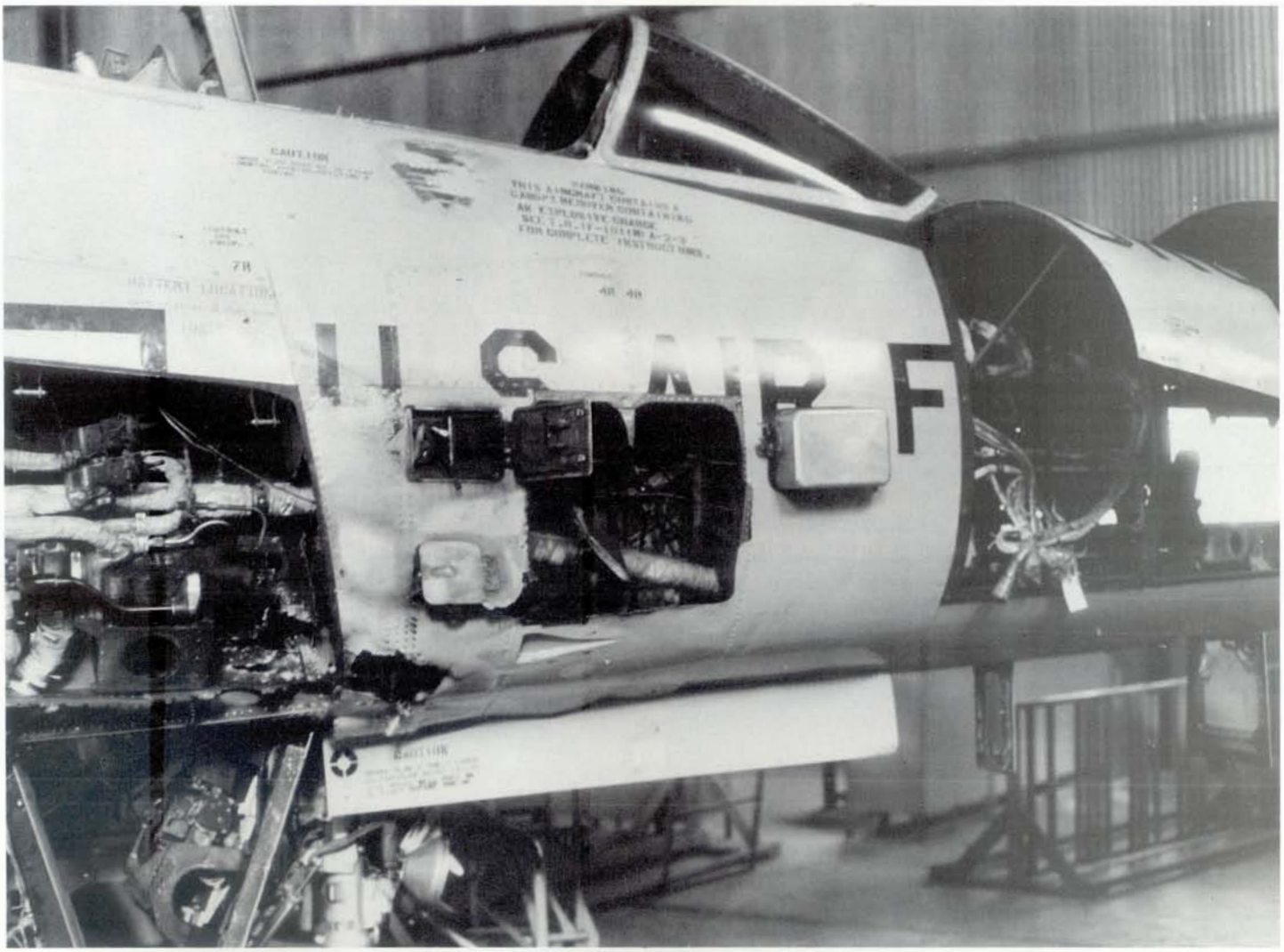
Voodoo experiences in Southeast Asia were limited, and initially peaceful in nature. That would change quickly ... but for the three Kadena based RF-101Cs which deployed to Takhli AB, Thailand for SEATO exercise 'Air Bull' during March of 1960, it was just another 'show the flag' peacetime exercise. They put on an airshow at Saigon on 9 March, then returned to Kadena without flying a single reconnaissance mission. On 6 June 1960 four 15th TRS RF-101Cs flew into Don Muang Airport in Bangkok, staying long enough to photograph ten objectives for the Royal Thai government. Neither of these deployments included flights into North Vietnam or Laos, but they did set the stage for things to come.

On 18 October 1961 an operational reconnaissance force of four 15th TRS RF-101Cs were deployed to Saigon International Airport, under the pretext of participating in an airshow being held as part of South Vietnam's 26 October 'National Day' celebrations. Under the code name 'Pipe Stem' Task Force the Voodoos were accompanied by both a photo processing cell and enough maintenance men to sustain flying activities. The airshow was cancelled but it was announced that the RF-101s would remain to 'log some flying time'. Heavy rains and devastating floods along the Mekong River provided a convenient excuse to further lengthen their stay. The Joint Chiefs of Staff (JCS) eventually directed the 'Pipe Stem' to conduct 'area covers' over the Laotian Plain of Jars and portions of that country which included the Ho Chi Minh Trail. North Vietnam complained about these over flights to the International Control Commission (ICC), which was supervising the 12 May cease fire. The ICC subsequently pressed for the withdrawal of the RF-101s as the rains abated and the flood waters receded. After thirty-one days and sixty-seven successful missions the 101s returned to Kadena.

During October of 1961 the Royal Thai government agreed to allow USAF RF-101s to operate out of Don Muang AB so they could photograph targets in Laos and South Vietnam. No overflights of Burma, Cambodia, China, or North Vietnam were authorized. Task Force 'Able Mabel' was immediately established and became operational on 7 November 1961 when four 45th TRS RF-101Cs arrived from Misawa AB, Japan. 'Able Mabel' consisted of seven pilots, a photo processing interpretation facility (PPIF), forty-five men and the four RF-101Cs. The force was to fly three missions per day for a period of one month with approximately seventy-five per cent of all sorties going to Laos (the remainder were to go into South Vietnam). Within a few weeks their stay was extended to 'indefinite' and most missions were going to South Vietnam, not Laos. This created problems because most targets in South Vietnam were at least 500 miles away. By mid-November provisions had been made for 'Able Mabel' RF-101Cs to land at Tan Son Nhut AB, Saigon, download their film, refuel, and fly another mission enroute to Don Muang. Tan Son Nhut became Operating Location 2 (OL-2) and provided continued support to 'Able Mabel' RF-101s after 'Pipe Stem' activities had ended. The more than 130 missions flown in 1961 resulted in 53,000 feet of film.

Thereafter, the 15th and 45th TRS rotated 'Able Mabel' flying duties every six months, while individual pilots and airplanes rotated each six weeks. A pilot would average 15 to 20 missions during each 'mini' tour and their flying time was simply logged as normal operational flying time. It was tough duty, requiring long hours and the stamina to withstand the tropical climate. The younger pilots viewed these missions as an opportunity to build flying time

This battle damage was suffered by a RF-101 Voodoo during a 1962 mission over Laos. Since the United States was not officially engaged in hostilities, the pilot was not given credit for a combat mission! (USAF)

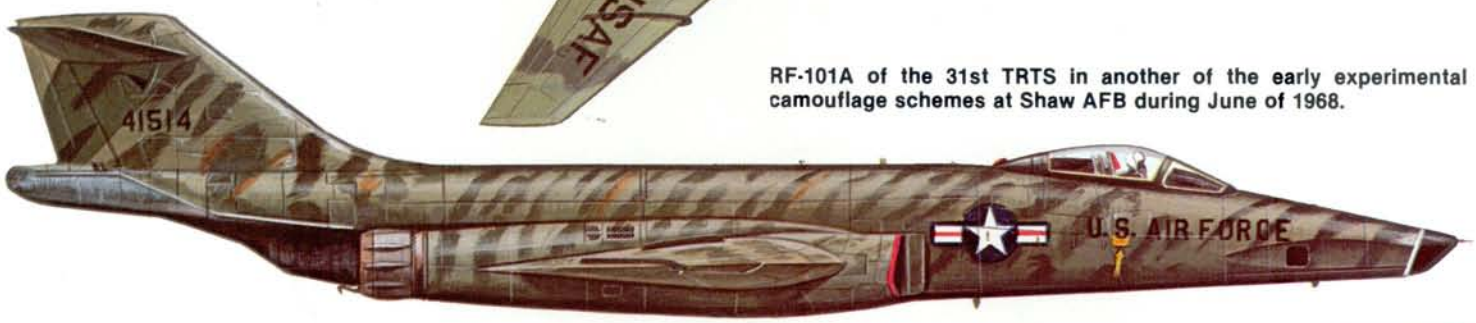


A PACAF RF-101C (56-0053) of the 15th TRS 'Cotton Pickers'. The Red lightning bolt on the tail was sometimes outlined in Gold. PACAF RF-101s were in natural metal until serious corrosion was found.

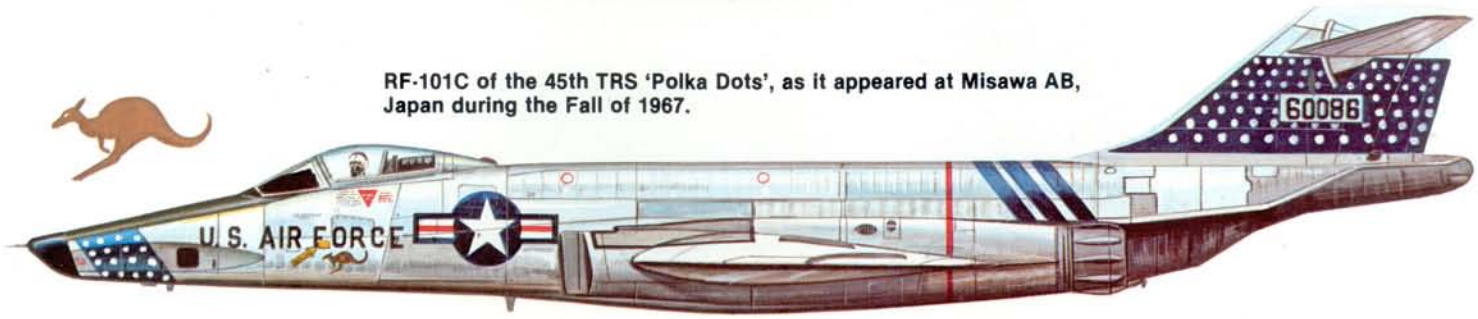
During the early sixties USAF began painting its Voodoos in overall Light Gray to give them added protection from corrosion. This Light Gray scheme was initially retained on RF-101s flying reconnaissance in Southeast Asia until the Green, Green, and Tan scheme replaced it.

RF-101C in one of the camouflage schemes that was tested before the SEA scheme of Green, Green, and Tan was decided upon.

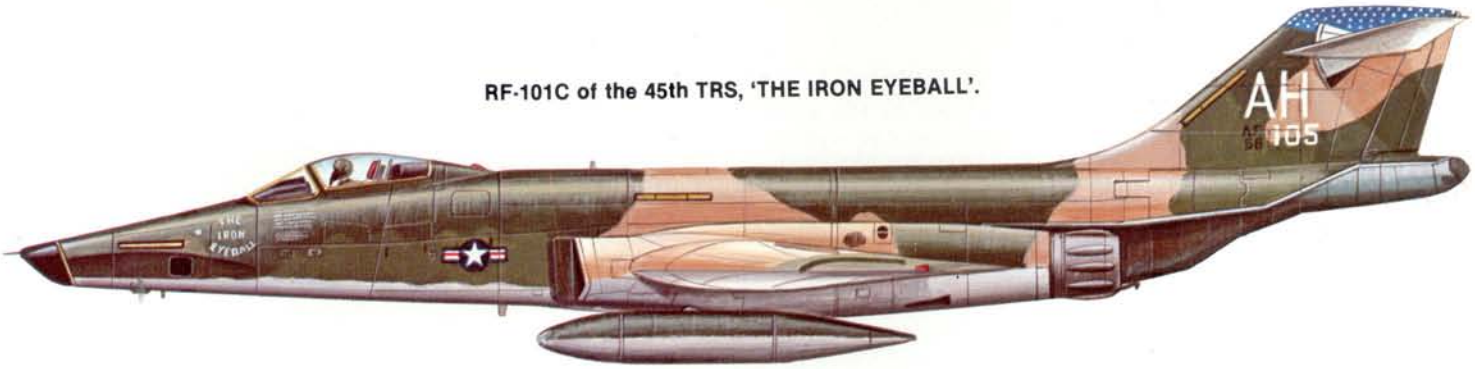
RF-101A of the 31st TRTS in another of the early experimental camouflage schemes at Shaw AFB during June of 1968.

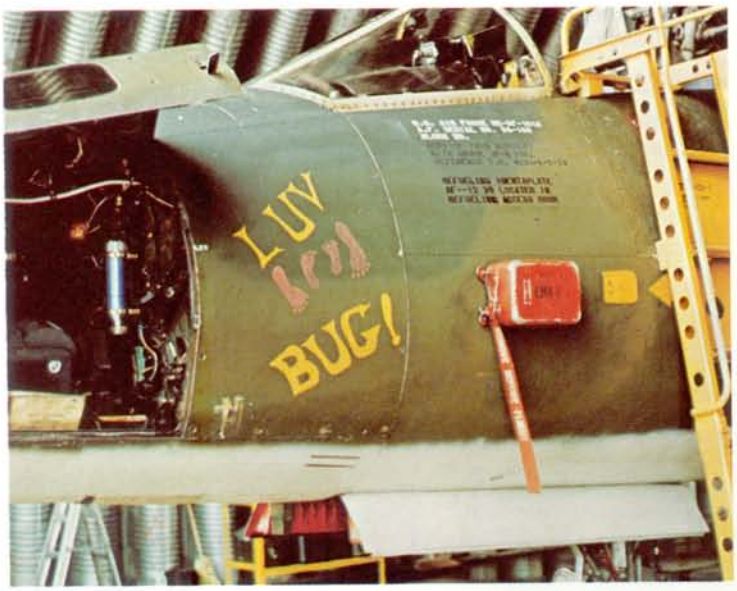


RF-101C of the 45th TRS 'Polka Dots', as it appeared at Misawa AB, Japan during the Fall of 1967.



RF-101C of the 45th TRS, 'THE IRON EYEBALL'.





(Above) Major Paul Cusick flew 'THE IRON EYEBALL', a RF-101C (56-105) of the 45th TRS 'Polka Dots' out of Tan Son Nhut during June of 1970. Another photo of 'EYEBALL' can be seen on page 47. (Major Wayne I Roberts)

(Above Left) 'GERRY'S CLOWN' was awarded three Purple Hearts by her pilot, after taking three hits over the A Shau Valley. (Major Wayne I Roberts)

(Left) The 'LUV BUG' (56-0166a), under the alias 'CIN MIN' (see painting on page 25), established transcontinental speed records during November of 1957 and went on to survive countless combat missions in SEA before being retired to the the Air Force Museum on 27 October 1978, with 6,604.9 airframe hours! A full view of 56-0166a without the 'LUV BUG' inscription can be seen on page 41. (Major Wayne I Roberts)

(Below Left) While most 45th TRS RF-101s at Tan Son Nhut carried individual markings during 1969-70, 20th TRS maintenance men at Udorn were so hard pressed to just maintain and repair their battle scarred RF-101s that they seldom got around to decorating them. (Major Wayne I Roberts)

(Below) Most reconnaissance pilots disliked fighter escorts and these markings were a 'tongue in cheek' comment on the shark mouthed F-4Es of the 388th TFW that provided escort for the for RF-101s of the 45th TRS. Tan Son Nhut AB June 1970. (Major Wayne I Roberts)

and improve their operational skills.

Initially, officials took great pains to conceal where the 15th and 45th pilots were going and what they were doing. The pilots were not supposed to tell anyone, not even their wives, where they were flying. But, what good husband or father would go away for weeks at a time and return home without souvenirs or gifts for his family? It didn't take very long for the wives to figure out what was going on. Occasional newspaper articles and radio reports of political unrest and military activities in Southeast Asia only substantiated suspicions, and soon the Southeast Asia reconnaissance flights became an open secret.

A few aircraft were hit by ground fire, but most pilots agreed that the most hazardous aspect of these missions were risks that had nothing to do with enemy action. Landing at the old Saigon International Airport (before it was enlarged and modernized to become Tan Son Nhut Air Base) was a feat in itself. Even after modernization, the multiplicity of aircraft types, with their wide variations in performance, coupled with an ever increasing traffic load and the chaotic direction of 'bilingual' Vietnamese traffic controllers all combined to make mid-air collisions a very real danger.

But an even greater problem was the lack of electronic navigational aids or accurate maps to navigate with. Visibility over Laos was greatly reduced during the fall, when stagnating air combined with the smoke from burning fields to produce a layer of smoke/haze that reduced visibility to near zero at times. The changing seasons brought significant topographical changes because heavy rains resulted in flooding that obliterated large areas. All this combined to make map reading and navigation extremely difficult. It took a steady hand and nerves of steel to let down through solid overcast into what was practically the unknown. Pilots found mountain peaks that were 6,000ft higher than indicated on their charts. Other areas were totally uncharted. The best maps available were the old French Auto Club tour guides, which were religiously passed from pilot to pilot. RF-101s could carry mapping equipment, but were not stable enough to be a good mapping platforms; it took a long time to get good maps into the hands of the pilots.

The Viet Cong learned soon enough that darkness brought freedom from detection from the air. Standard RF-101Cs were not capable of night photography, and this prompted the return of four 15th TRS RF-101Cs to the United States for depot level modifications to provide them with at least limited night photography capability.

The standard KA-2s and big KA-1s were removed and existing off the shelf equipment from other systems was substituted. Four 4.5 X 4.5 inch format KA-45s replaced the KA-2s up front and two 12 inch KA-47 cameras with high speed bodies displaced the KA-1s. Extensive modifications were required to provide controls and mountings. Illumination was provided by up to eighty M-123 flash cartridges which were carried in an external centerline mounted pod that had been developed for the RF-84F. An APN-102/ASN-7 Doppler/Dead Reckoning navigation computer was installed to improve navigation. These modified RF-101Cs were dubbed 'Toy Tigers' and returned to Kadena during May of 1962. They were not deployed to Don Muang until August, when the photo cartridges were finally delivered to the 15th. They had only flown a few missions, when they were recalled to the States for possible use during the Cuban Missile Crisis.

(Below) RF-101 taxies in after a 1965 reconnaissance mission over North Vietnam. It carries one of the experimental camouflage schemes applied before standardization of camouflage. (USAF)

Once the Cuban crisis was past, all but one of the Toy Tigers were returned to Southeast Asia for additional trials. Mechanically, everything worked perfectly, but several serious shortcomings were apparent. Dense jungle foliage absorbed light, while flooded rice paddies reflected it, making proper exposure very difficult. The two second delay flash cartridges illuminated an area behind the aircraft, which provided poor quality lighting and low density negatives. Residue from spent cartridges (a 5/8 inch metal rod, 3 inches long) had to be ejected from the cartridge pod. They could cause extensive property damage and fatal injuries...a highly undesirable calling card from an unarmed reconnaissance airplane. Night photo runs had to be made on instruments with an operational autopilot because the brightly flashing cartridges created a significant distraction and confusion in the cockpit. Further limitations of the photographic equipment required flying over the target at between 1500 and 2500 feet, at relatively low airspeeds. All of these conditions were invitations to disaster when photographing a defended target.

Most RF-101s that had taken hits were flying below clouds at relatively low altitude, but Captain Thomas A O'Meara was hit by a 37 or 57mm shell while flying at 8-10,000ft on 14 August 1962. He was not seriously injured, but the explosion knocked out his electrical system, navaids, and damaged hydraulic lines. He was able to find Don Muang, but the airplane was further damaged during landing when the nose gear collapsed due to the hydraulic line damage.

Tactical reconnaissance operations over Laos were suspended after this incident, but were resumed after stricter flight guidelines were established. The JCS terminated Laotian flights on 6 November 1962 and subsequently directed the redeployment of 'Able Mabel' operations to Tan Son Nhut by 15 December 1962. RF-101s would not return to Laos until May of 1964.

Heavy demands for long range missions throughout Southeast Asia and numerous area covers inside South Vietnam created a backlog for the 15th TRS detachment at Tan Son Nhut during 1963. 'Able Mabel' was increased from four to six RF-101Cs on 1 April, when two former 45th RF-101Cs arrived. (Two additional RF-101s were deployed to Don Muang during May for two weeks to run area covers for the Thai government.)

RF-101Cs, known as 'Toy Tigers', were equipped with four KA-45, two KA-47 cameras and carried flash cartridge ejector pods on the centerline to provide limited night photo capability and enhancement of day photography of enemy positions in deep valleys, or under heavy overcast conditions.

A very freshly painted (note that the paint has not even burned off the exhaust yet) RF-101C being serviced on the ramp at McClellan AFB, CA prior to being deployed to Vietnam, 16 October 1965. (Douglas D Olson)

The 'Able Mabel' task force at Tan Son Nhut was using a third of all RF-101 flying time authorized to PACAF units, with their aircraft flying more than thirty-five hours per month. PACAF reconnaissance units were hard pressed to cover its normal recce commitments, maintain peak pilot proficiency and still support 'Able Mabel'. Requests for additional RF-101s — or even some out of service RF-84Fs — were flatly denied.

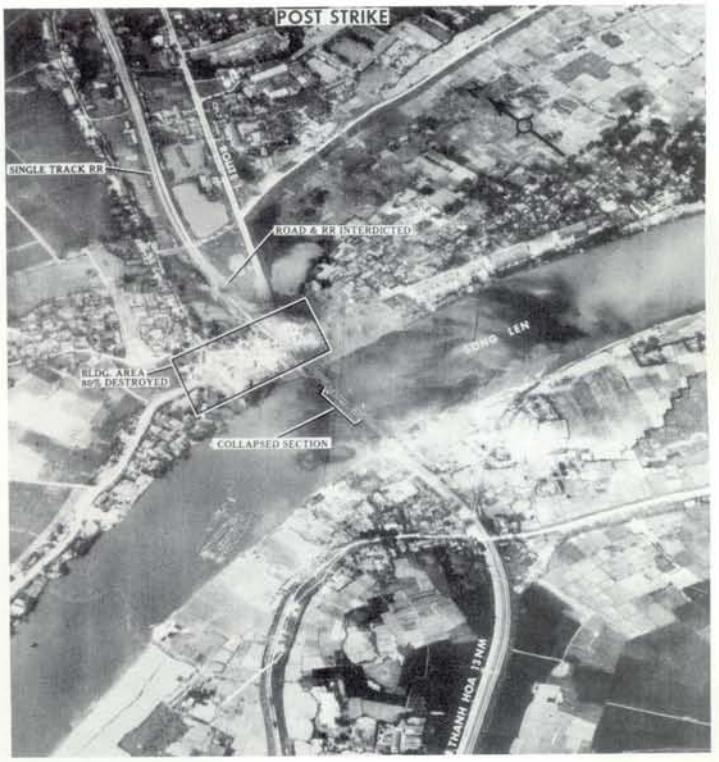
During July of 1963 the 'Able Mabel' task force became a part of the 33rd Tactical Group at Tan Son Nhut Air Base under operational control of the 2nd Air Division. 'Able Mabel' ceased to exist as a semi-autonomous force, but the name persisted. This change brought with it demands to resume the hazardous night missions that had produced such poor results a year earlier. Experimentation and further equipment modifications resulted in painfully slow improvements, but by the end of 1963 some acceptable night reconnaissance was being attained.

When the 45th TRS took over from the 15th TRS at Tan Son Nhut on 1 November 1963, the 15th was averaging four to five operational sorties per day, with one aircraft and pilot being kept on day time alert to scramble after 'hot' targets. The reconnaissance task force was strengthened to ten RF-101Cs on 30 April 1964, and was again designated 'Able Mabel' task force. Less than three weeks later, on the 17th of May, Pathet Lao forces attacked neutral Laotion forces in the Plain of Jars. Premier Souvanna Phouma of Laos immediately consented to renewed reconnaissance overflights. By 19 May four RF-101 sorties had been dispatched to Laos and the JCS directed photography of infiltration routes from North Vietnam through Laos to South Vietnam with particular attention being given to the Ban Thay military installations east of Muong Phine. There were no restrictions regarding the number of sorties flown, but North Vietnam was still off limits.

A US Navy task force moved into the South China Sea and carrier based RF-8 Crusaders joined USAF RF-101s, establishing the 'Yankee Team' flying reconnaissance missions over Laos. Many of these missions required time consuming fuel stops at Danang, until carrier based KA-3 Skywarrior tankers were made available to provide in-flight refueling for the Voodoos until USAF KB-50s were made available on 9 June. When one of the photo Crusaders was shot down on 6 June over the Plain of Jars, the JCS immediately authorized armed escorts for all Laotion reconnaissance flights. An F-8 Crusader fighter escort was downed the following day, which resulted in a retaliatory strike by eight USAF F-100 Super Sabres against the AAA sites at Xieng Khouang. Subsequent RF-101 missions were given fighter escorts of up to four F-100s when their targets were in the Plain of Jars. Pilots now reported seeing large numbers of truck convoys along the Ho Chi Mihn Trail, and they encountered significantly heavier and more accurate AAA fire.

Approximately seventy tactical aircraft were rushed to Southeast Asia following the 2 and 4 August 1964 Gulf of Tonkin incidents. Composite Strike Force 'One Buck', including six RF-101Cs from Shaw AFB, were sent to reinforce the 15th TRS, which had been conducting 'Able Mabel' operations since 1 May. 'Able Mabel' was now increased from six to twelve RF-101Cs immediately after the first incident, with the addition of four aircraft from the 15th and two from the 45th.

Recce pilots were frustrated by unusually poor flying weather over Laos during the annual May to October monsoon season (which averaged 50 inches of rainfall). The 2nd Air Division finally ordered daily high altitude RF-101 weather scouts to determine if conditions would permit reconnaissance photography. Ironically, the weather scouts carried film but were not allowed to photograph targets.



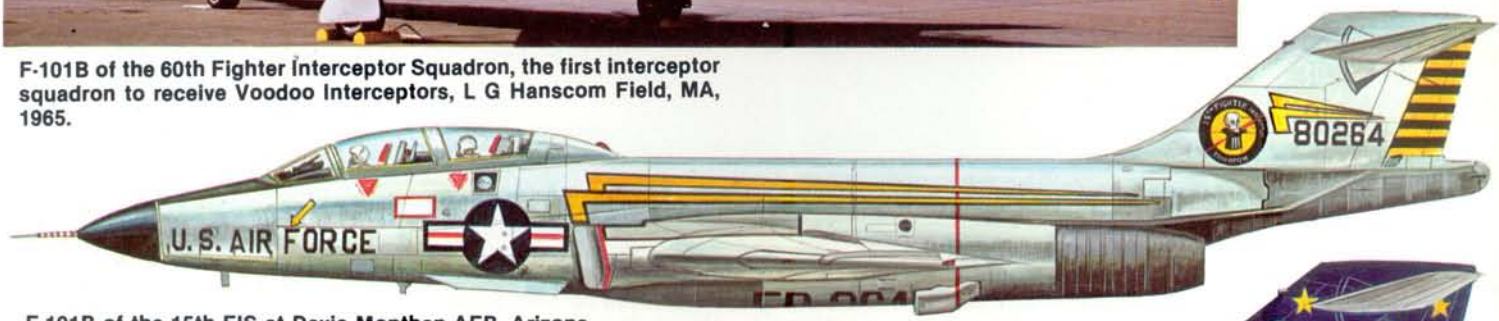
Post strike photo of the destroyed Dong Phuong Thuong bridge taken by RF-101 on 3 April 1965. (USAF)

Weather was not their only problem. Many missions were to northern Laos, which was beyond aircraft range. This required either a fuel stop, or in-flight refueling. Captain Burton L Waltz of the 15th TRS flew one of the more interesting of these missions:

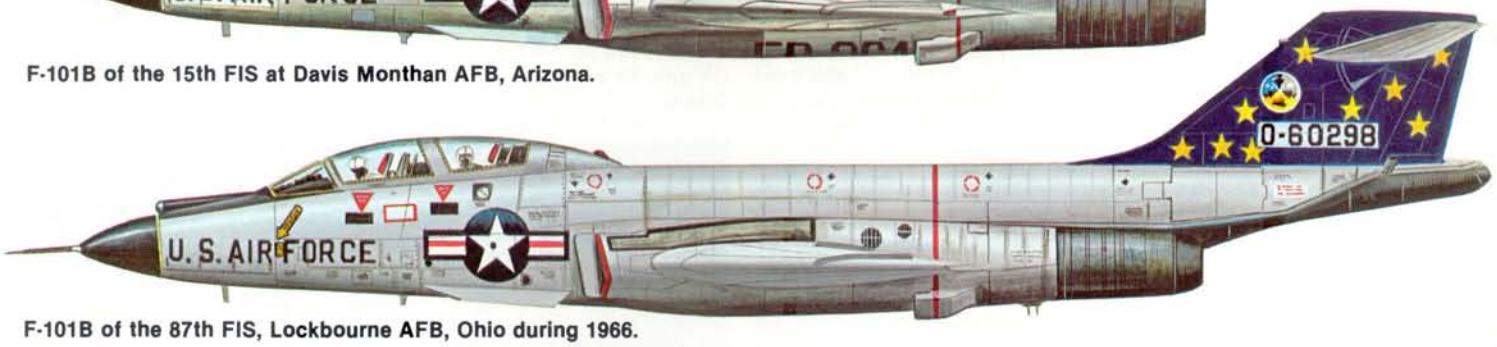
My 21 November 1964 mission was a high-lo-high profile of Highway 23 from Sepone, Laos up past the Mu Gia Pass. Our operations officer, Capt

15th Fighter Interceptor Squadron

F-101B of the 60th Fighter Interceptor Squadron, the first interceptor squadron to receive Voodoo Interceptors, L G Hanscom Field, MA, 1965.



F-101B of the 15th FIS at Davis Monthan AFB, Arizona.



F-101B of the 87th FIS, Lockbourne AFB, Ohio during 1966.

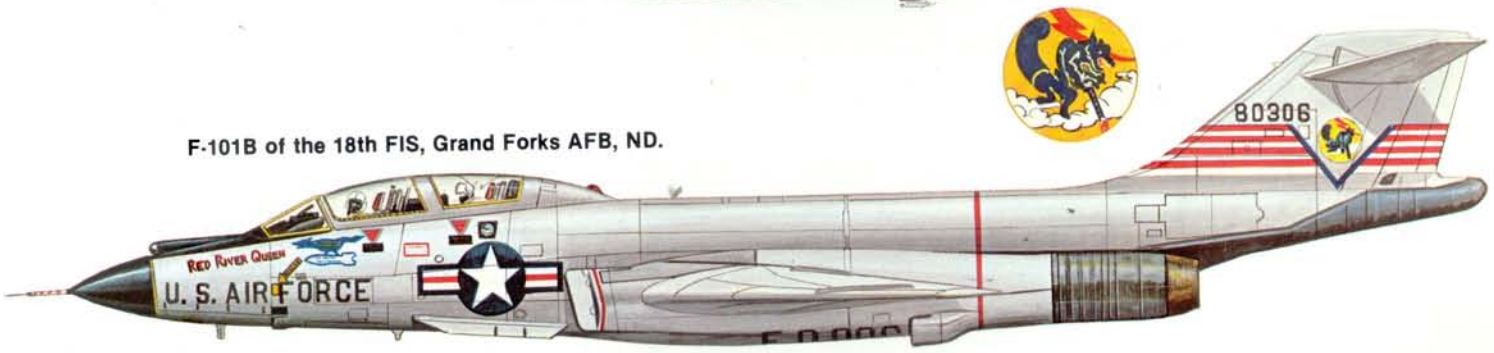
F-101B of the 437th FIS carrying both squadron markings and 27th Air Division (Red, White, and Blue stripes) markings on its tail at Oxnard AFB, CA.

F-101B of the Air Defense Weapons Center (Tyndall AFB), April 1973. (Lou Drendel)

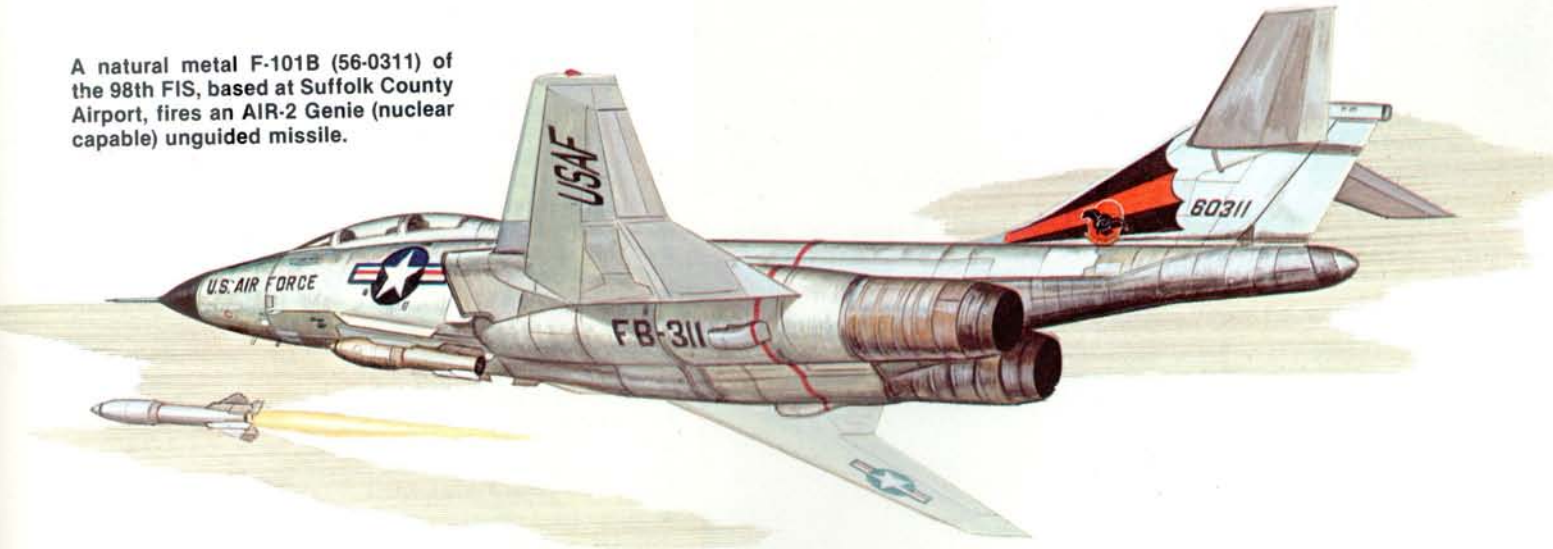
CF-101B of the RCAF's 409 Squadron 'Nighthawks'. A FY59 Voodoo Interceptor, 395 does not carry the nose mounted IR sensor.

F-101B of the 136th FIS, New York Air National Guard, Niagara Falls, 1973.

F-101B of the 18th FIS, Grand Forks AFB, ND.



A natural metal F-101B (56-0311) of the 98th FIS, based at Suffolk County Airport, fires an AIR-2 Genie (nuclear capable) unguided missile.



Overall Gray F-101B of the 179th FIS Minnesota Air National Guard armed with a pair of White and Red radar guided AIM-4A missiles.

Reconnaissance Voodoos brought back post-strike pictures of the the Xom Ca Trang Highway Bridge after it was dropped in 16 April 1965. (USAF)

(Above) 57mm AAA positions firing at a Voodoo while it takes their picture, August 1965. (USAF)

(Below) NVA machine gunners train their weapons on a low flying RF-101. The concrete structures are an old French fort. August 1965. (USAF)

George Hall, laid on an additional target as I was preparing to climb aboard the airplane (56-230). He wanted photos of a small grass airfield at Ban Phan Hop which was about five miles off the highway and approximately ten miles south of the pass.

Captain Ken Thomas and I took off from Tan Son Nhut and headed toward Danang at 480 knots and 33,000ft. We refueled on a KC-135 northwest of Danang and picked up our fighter escort of two F-105s for the flight into Laos. We let down at Sepone. You never knew...one day they would shoot at you, and the next day they wouldn't. The weather that day was bad — ceiling of about 1,200ft, with tops at 3,700ft. I ran my route along the road and up through Mu Gia Pass, passing several miles from the airfield. We were fired on but it was nothing serious. I swung around, and headed back to cover the airfield. Being five miles away, they were alerted to the fact that we were in the area.

We had a rule; 'NEVER go back to a target the second time!' I violated that rule by flying within 20 degrees of my original track in the opposite direction toward the airfield. I had left the area for about 8 minutes, thinking they would go back to sleep ... or whatever they were doing. No such luck. They were ready and waiting when I broke through the clouds at 800 feet and rolled out on a heading over the field. They really let us have it as I crossed the field at 480 knots! I had to stay wings level for the photo run, and couldn't do much in the way of altitude change because of the low ceiling. The first golf ball sized tracer went right across my wingtip. They really had me zeroed in, and they walked the fire right up the wing. I felt six hits and knew I was hit bad because the last one went off right under my seat. And it really jarred! Every warning light in the cockpit lit up. Both engines were knocked out by the last hit, but I was able to pull the nose up before the stick froze. I yanked the handles and punched out as the airplane ran out of airspeed just above the clouds. One of the Thuds had followed me into the clouds, and he later told me that a wing came off right after I ejected. I am sure it was a 37mm that got me.

My chute opened in the clouds and when I broke out of them I discovered two things. I was falling toward the side of a 500ft limestone karst, and my parachute had a malfunction. I was spiraling down much too rapidly. I braced myself and tried to protect my face as I fell into the 100 foot trees towering over the jungle floor. I remember being stopped — hanging in the trees. I seemed to be alright, except for blood on my sleeve, probably from my broken nose. My greatest concern was that I was within a quarter of a mile of the gunsite that had knocked me down. I wanted to get on the ground and hide as quickly as possible.

We had originally been flying without survival equipment to get us down out of the trees. Fortunately, I had attended an excellent British jungle survival school in Singapore, and had applied a lot of the lessons they taught. One thing they were emphatic about was that if you were shot down, you would probably end up in the trees, and would have to have a way to get down. We used our survival kits as a seat cushion and a block held our chutes up to serve as a backrest. We removed the spacer block and replaced it with a

hundred foot coil of rope. We could tie the rope to our parachute risers, then rappel to the ground.

I was really hurrying and couldn't get the coil of rope loose. I finally cut it off and tied it to the chute risers. The rope just barely touched the ground when I threw it down and checked it for security. It seemed to be secure when I stepped off, but within a few feet something broke loose and I fell 70 feet to the ground. I don't remember hitting the ground. I do remember laying there and not being able to do the things I wanted to because of multiple fractures of leg and arm. I kinda figured 'this is it' because in those days we didn't have much in the way of rescue forces in the area.

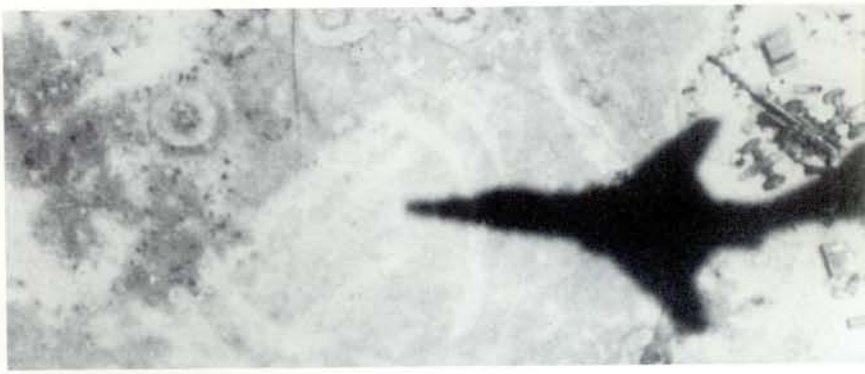
I could hear Chuck McClarren and his wingman working over the gunsite, then I passed out. When I came to a couple of hours later, I could hear chopper blades. They got close, then went away. Sometime later I saw two armed soldiers coming toward me. I was pretty much resigned to trying to take them with me, but for some reason, I didn't shoot. As they got closer, I saw that one of them was carrying an American AR-15. They were Laotion Rangers! They tried to help me up, but I couldn't make it. They went back to the chopper and returned with a blanket to carry me in. They didn't have any Morphine, and the pain was excruciating during the half mile trek across rough terrain to the chopper. I was flown to the field hospital at Nakhon Phanom, Thailand, where they gave me a big dose of Morphine, and put me on a SA-16. I woke up in the hospital at Korat RTAB a week later.

Waltz had been picked up by a chopper flown by Mr Ed Reed of Air America. He was accompanied by an American T-28 maintenance officer, Captain Bob Schmiedenbach, and the Laotion Rangers. They had been alerted to the shoot down by Waltz's wingman, and had been directed to the area of his parachute by the Thud escort pilots. Waltz's injuries mended, and he went back to the recce business, this time flying RF-4Cs. He has since retired from the Air Force as a Lt Colonel.

Ironically, Waltz and the 15th TRS had been scheduled to go home on 1 November 1964, but had to stay when the 45th TRS was unable to take over 'Able Mabel'. Most of the 45th's RF-101Cs had been sent to the States for depot level '1181 modifications', which were not completed on schedule. The delays being caused by slippages in the delivery of contractor supplied camera equipment.

Mod 1181 was used to update existing RF-101s with Hycon KS-72 cameras and automatic controls that had been developed for the RF-4C program. The RF-101Cs also retained their manual back up controls which were much appreciated by recce pilots. The mod 1181 changes were initially unpopular with pilots, maintenance men, and the photo processors. But they gave the aircraft a low altitude capability to match the airframe's performance. However, early models of the KS-72 did not perform up to expectations and pilots had a tendency to expose too much film, which overloaded the film processors. The KS-72 was a complex camera that required a great deal of care by skilled technicians.

(Above) A freshly updated and camouflaged RF-101C prepares to depart Hickam AFB for combat duty in Southeast Asia. Ferry pilots delivered most RF-101s to South East Asia, while the combat pilots rode to the war zone in commercial airliners. The flaps are in one of two available positions (up or down). The wide track of the 101 landing gear made for smooth and sure ground handling. 16 December 1965. (USAF)



(Above) RF-101's shadow races across this NVA 57mm AAA site as the Voodoo was photographing the enemy emplacement during January of 1966. (USAF)

(Above) RF-101s were among the first to verify the presence of Russian built SA-2 surface to air missiles (SAMs) in North Vietnam, bringing back this photo in 1965. (USAF)

F-101B used by Colorado State University in high altitude research of severe storms. The Gray Ghost carried extensive instrumentation.

One of the 'new' CF-101Bs of 409 Squadron 'Night Hawks' in the later Canadian Armed Forces markings containing both French and English.

LIQUID OXYGEN/OXYGENE LIQUIDE is carried on the oxygen bottle refill tank. CAFB Comox, BC (Edwin K Kitow, Jr)

(Above) New York Air Guard F-101B on a rare solo pilot (note empty back seat) cross country flight out of Malmstrom AFB enroute to McCord AFB. (Major Edwin K Kitow, Jr)

(Below) F-101B-85-MC of the 116th FIS, Washington ANG at Hill AFB, Utah on 27 May 1973. An Ace of Spades playing card with a sword through its center is carried on the forward fuselage just below the pilots cockpit. (Sgt Benjamin Knowles, Jr)

F-101B (58-0275n) of the Minnesota Air Guard. (General Wayne C Gatlin)

CF-101B of 409 Squadron 'Night Hawks' as it appeared during a visit to Peterson Field, Colorado on 10 September 1977. (Brian C Rogers)

F-101B of the 178th FIS North Dakota Air National Guard 'THE Happy Hooligans'.

(Above) A 1966 recce mission to North Vietnam was scratched when a side brace actuator on the main landing gear of this RF-101C failed during taxi at Tan Son Nhut. Probably no other system on the aircraft caused more consistent grief than did the Voodoo's landing gear. (Capt Patrick Reaves)

The KS-72C and subsequent models, however, gave good service and provided high resolution 4.5 x 4.5 negatives. The KS-72 produced it's best results below 8,000ft and above 20,000ft, which left the 101s without a good medium altitude camera. The 1181 Mods cost $187,000 per aircraft.

Communist attacks on Bien Hoa in December of 1964, and Pleiku in February of 1965 led to ROLLING THUNDER, the on going bombing campaign against North Vietnam. This emphasized the need for a reconnaissance base closer to the action than Tan Son Nhut. Construction on a new base at Udorn, Thailand was given high priority.

(Below) As a result of successful Viet Cong attacks on air bases within South Vietnam, more and more revetments were built and guarded around the clock by base security forces. A2/C William O Moore guards this RF-101 at Tan Son Nhut in 1966. (USAF)

(Below) RF-101s operated from Phu Cat in late 1966, sometimes carrying no markings other than mission marks under the cockpit.

The 45th TRS deployed eight Mod 1181 RF-101Cs to Tan Son Nhut on 1 February 1965 to take over 'Able Mabel'. The 15th TRS returned to Kadena, but was scheduled to move to Udorn as soon as the base was operational. After a two month break from combat, the 15th 'Cotton Pickers' deployed six RF-101Cs to Udorn and resumed operations on 1 April 1965. The 15th had sent their first RF-101s back to the States during January of 1965 for 1181 Mods and all but three had been updated by mid-1965. GREEN PYTHON was the name given to RF-101 reconnaissance operations out of Udorn, and the pilots actually kept a large green python as a mascot!

The RF-101 mission in Southeast Asia was greatly expanded with the initiation of bombing raids into North Vietnam. Weather scouting missions now included North Vietnam as well as Laos. Weather scouts generally had the last word on whether or not a bombing raid was launched.

Reconnaissance pilots were called upon to serve as pathfinders for a number of bombing raids into North Vietnam after several flights of fighters had become lost or bombed the wrong targets. A single RF-101 would lead the fighters to their targets, conduct pre-strike photography, then return with the fighters. A pair of RF-101s would then conduct post-strike battle damage assessment (BDA) photography a few minutes later and return by themselves. Eventually, reconnaissance Instructor Pilots gave crash courses in low-level dead-reckoning navigation. Pride was all the motivation needed by any self respecting fighter jock, and they quickly learned how to get around by themselves, allowing the recce jocks to get back to the photography business.

Another little known and short lived RF-101 mission was its electronic countermeasures (ECM) support. Several RF-101s were modified to carry QRC-160 ECM pods and flew the first known ECM escort flights into North Vietnam on 29 April 1965. The equipment was not very effective and its use was soon discontinued.

Photo confirmation was the name of the game in Southeast Asia. If it wasn't on film, it didn't exist! (In spite of the fact that recce pilots were all accomplished observers.) Laos, North Vietnam and South Vietnam all presented different types of targets and the missions to each country changed with the strategy applied to each area.

Field commanders in South Vietnam and Laos wanted endless 'area covers' to compare military activities in their sectors over given time spans. Routes of communications (roads, railroads, rivers, streams, and trails) in Laos were routinely monitored along with known staging areas. Most of these missions were flown at optimum speed and altitude for fuel conservation. The risk of being shot down over South Vietnam or Laos was relatively small, but the odds increased significantly in certain areas, especially if weather forced the recce birds low. AAA fire always increased during the dry season, when infiltration pipelines kept the gunners well supplied with ammunition. A pilot's chances of recovery after being shot down over South Vietnam were better than over Laos, but he faced almost certain death if captured in either country. Fighter escorts into Laos were discontinued during the spring of 1965. F-105s lacked the range and endurance to stay with the RF-101s, and there always seemed to be rendezvous problems. A second recce bird replaced the fighter escort until heavy work loads forced an end to most two aircraft reconnaissance flights into Laos.

Most RF-101 reconnaissance sorties into North Vietnam were either pre or post strike missions. Pre-strike missions were scheduled prior to a bombing raid to establish or update target folders and for subsequent damage assessment evaluations. Post-strike BDA missions were flown shortly after the conclusion of bombing on targets which were struck in North Vietnam, Laos and some over South Vietnam. Most BDA missions over North Vietnam were very hazardous. Vietnamese gunners quickly learned to expect a pair of RF-101s to come screaming over about five minutes after the departure of a strike force. The enemy had no fear of reprisal during the BDA photo runs, and they really came out of their holes to vent their spleen on the unarmed reconnaissance birds. Several 101s were downed by gunners who would stick the butts of their weapons into the ground, fire straight up into the air, and wait for the airplane to fly through their curtain of fire. The RF-101C did not have self-sealing fuel tanks and became a flying time bomb whenever they took hits in the fuselage fuel cells. Fire, of course, was a constant concern of the pilots, but the Voodoo was a tough bird otherwise. The Pratt and Whitney J-57 engines were 'virtually indestructible', quoting a hundred mission veteran. Having that second engine saved the day for a goodly number of 'One-O-Wonders'.

Surveillance missions were flown into North Vietnam to document highway, railroad and water traffic, and to check on the progress of repairs being made to previously bombed targets, but most were either pre- or post-strike. Reconnaissance target selection was dependent upon the emphasis that was being placed in the bombing campaign.

USN and USAF reconnaissance airmen flew 184 surveillance missions over North Vietnam during the first three days of a week long bombing halt in May of 1965. The PACAF airmen were aided in this maximum effort by six

TDY 363rd TRW RF-101Cs. ROLLING THUNDER resumed with a vengeance after the North Vietnamese reacted negatively to peace overtures.

Most reconnaissance flights over North Vietnam were made at altitudes of 20 to 30,000ft until mid-1965 when SA-2 SAM sites were observed under construction near Hanoi. Since SAMs were extremely effective at these altitudes, the RF-101s immediately started flying low level missions. The recce airmen also began flying two man flights into all high threat areas of North Vietnam. Low altitude meant reduced endurance, fewer targets covered per mission, and increased workloads for the pilots. Low level missions were much more difficult to fly and placed the RF-101s in an environment where they faced massed small arms and AAA. Aircraft hits increased dramatically.

Concern over the accuracy of SA-2 SAM missiles was well founded. They brought down their first American aircraft on 24 July 1965, setting into motion 'The Great SAM Hunt'. RF-101s were dispatched into North Vietnam every two hours and given complete run of the country until they could locate the guilty SAM site. 29 July was a fateful day for recce airmen. Majors Daniel J Doughty and Marvin R Reed flew into North Vietnam at low altitude, searching for the elusive SAM site. Having no luck, they decided to gamble on 'popping up' for a better view of the countryside. The tactic worked, and they photographed a mobile SAM site. As soon as it was spotted, they dove back to low level. They had performed the first 'pop up', a tactic that would be adopted, refined, and used by nearly every strike outfit flying over North Vietnam.

Experience would prove that a pilot could safely 'pop up' to altitudes of 10 to 15,000ft with the aid of afterburning, for periods of two to three minutes without SAMs being able to lock on and fire. With proper planning, they had plenty of time to photograph their targets before diving down to treetop level again. This 'pop up' maneuver allowed the pilots to use their best cameras (KA-1s) while escaping much of the deadly AAA which was usually concentrated around the targets. Ideally, a pilot would 'pop' off a mountain range to hide his approach and jink during the entire run, except during the actual photo run, which was of brief duration. 'Pops ups' were routinely performed over most high threat targets until 20 April 1967 when improved ECM equipment allowed the RF-101s to resume flying medium altitude (15-20,000ft) missions.

Major Jerry D Lents and Captain Jack W Weatherby took off from Tan Son Nhut two hours behind Doughty and Reed on 'The Great SAM Hunt'. Their mission was destined to end in tragedy. Major Lents recalls:

Jack had completed his first mission of the day ahead of me and was planning another SAM search mission when I returned. We had both flown the usual 2.5 hour area covers over South Vietnam. We mulled the mission over and took off for North Vietnam. Jack was leading. Shortly after we left Pleiku heading north across Laos toward Thailand for our first refueling, Marv (Major Marvin R Reed) overheard our radio conversation with the tanker, and asked where we were going. Jack told him, and Marv replied; 'Don't go, we've got it! We got the target!' But, we had orders to search for the SAM sites until the photo interpreters had their film in hand, so we pressed on. Jack lost his transmitter, but could still receive. I assumed lead. The tanker track had been weathered in, but we found them some distance away and got our gas. We dropped our empty tanks over Laos and contacted the command post at Udorn for the word. The word was 'go'.

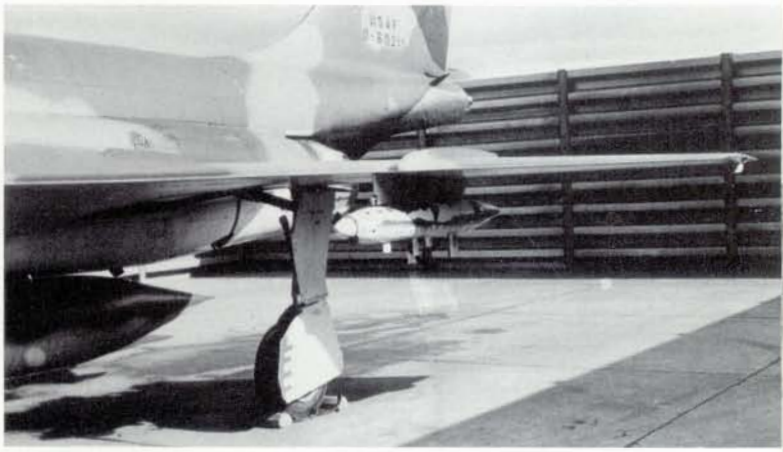
Jack signalled that he wanted the lead back, so I moved out and abeam in our standard combat spread. We let down to 200ft and crossed into North Vietnam at our Redline speed of 600 knots. My RHAW gear lit up with a heavy green strobe as we crossed the Red River. Suddenly, Jack came up on the radio for the first time since Pleiku and announced; 'I've got a hit. I'm breaking off to the north!' I saw the hole in his aft fuselage section, slightly above and forward of the afterburners. I crossed over him during our turn and replied; 'Yes, Jack, you've got a hole thru the fuselage.' Then I saw a little fuel start to come out of the fuselage. I called; "There's a little fuel coming out, but it's not bad." Then I saw a little flame start to come out of the hole, and I yelled; 'Jack! Your'e on fire! GET OUT! GET OUT! GET OUT!' It blew up — the whole tail section came off and tumbled back. The fuselage was one big fireball. We had only been at 200 feet, but his whole airplane and 13-14,000lbs of fuel was consumed in the air by that fireball. Very little of it hit the ground. No black smoke. Nothing.

There wasn't anything I could do for Jack. I circled around and headed back. We were told to return if a man went down so we could report what had happened to him. I called for a tanker and took on enough fuel for the flight back to Tan Son Nhut. Ironically, Reed and Doughty already had the film, and the command post was trying to recall us at the time Jack was hit, but couldn't get through because of our low altitude.

Major Lents went on to fly 251 combat missions, one hundred of which were 'counters'.

With the introduction of SAM missiles during the latter half of 1965, the North Vietnamese began the integration of their air defense system. They concentrated AAA around major targets, and when the SAMs forced strike aircraft to low level, they became vulnerable to AAA. Ground observers supplemented radar networks in alerting gunners to low flying aircraft and massive volumes of barrage fire were directed at low flying aircraft. This tactic used large stocks of ammunition but was particularly effective against RF-101s. Anytime RF-101s were forced to operate below 5,000ft they took hits with resulting losses. The 'pop-up' maneuver that Majors Doughty and Reed originated was especially valuable because it permitted the pilots to overfly their targets high enough to escape most of the AAA barrages surrounding heavily defended targets.

Twenty Udorn based RF-101s were struck by hostile fire during the second half of 1965. Seventeen of them returned to base, with one of these being lost during the landing attempt at Danang, however, the pilot escaped serious injury. Of the three that failed to return, one pilot was killed in action, one became a POW, and the third was rescued. All twenty aircraft had been hit at low altitude while operating at or near redline speeds.



(Above) With the introduction of Soviet supplied SA-2 Surface to Air Missiles (SAMs) into the North Vietnamese air defense system, Electronic Counter Measure (ECM) pods became necessary for survival.

(Above) RF-101C with ECM pods mounted under each wing just outboard of the wing fences is fueled and ready for a mission out of Phu Cat AB, South Vietnam.

(Above) The individual open topped revetments at Phu Cat provided less protection than the quonset hut style shelters used by a number of the RF-101s based at Tan Son Nhut. The port drop tank is laying in its cradle along the revetment wall.

(Above Left and Above) Texas Air Guard F-101Bs before and after their William Tell victories in 1978 and 1980. (Paul Stevens and Wally Van Winkle)

Nevada Air Guard RF-101B (formerly a CF-101B) about to take on fuel from a KC-135. (USAF via Norman E Taylor)

With the exception of modest inputs of Shaw airmen on a temporary basis, PACAF pilots carried the brunt of RF-101 reconnaissance duties through 1965 when the 20th TRS arrived from Shaw during December of 1965 and January of 1966. They arrived just in time for the Christmas bombing halt of 1966, and were initiated into an unusually hostile reconnaissance environment. Bombing halts resulted in massive resupply and repair efforts in North Vietnam. Enemy gunners had ample supplies of ammunition and no fear of air attack. They came out of their holes and fired everything they had at the reconnaissance birds. (Bombing halts did not include a moratorium on reconnaissance flights.) Captain Wilmer N Grubb went down on 26 January and died shortly thereafter as a POW. The 20th operated out of Tan Son Nhut until the closing days of March 1966, when they deployed to Udorn and took over 'Green Python' from the 15th TRS.

The 15th TRS had flown 6,786.25 combat hours during 4,349 sorties out of Udorn between 31 March 1965 and 2 April 1966 when their last RF-101 departed for Kadena. They had logged a total of 6,328 combat sorties and 11,016 hours from 1 May 1964 when they started keeping track of missions. Prior to that, missions into SEA were simply logged as routine flying time! The 'Cotton Pickers' were awarded ten Silver Stars, fifty-two Distinguished Flying Crosses, more that 265 Air Medals and sadly, five Purple Hearts. Two 15th TRS pilots were involved in one of the great mysteries of the war. Captains Gordon L Page and Jerdy A Wright Jr took off from Udorn and disappeared without a trace thirty minutes later. They were tracked on radar to the area of Vinh, North Vietnam, then lost. The USS Berkeley intercepted radio messages from an unidentified aircraft indicating that his wingman had been hit by a SAM at about that time, but searchers could find no wreckage. Both men were eventually declared KIA.

Six veteran 'Cotton Pickers' stayed at Udorn for an extra three months to help the 20th TRS transition into the hostile combat environment they faced over North Vietnam. 15th RF-101s and eligible pilots were dispatched to Tan Son Nhut or Udorn as replacements for losses until the unit ran out of aircraft during December of 1966. The 15th was subsequently reformed as an RF-4C unit, and is still active.

The 20th TRS was a unique organization. It was assigned to the 460th TRW at Tan Son Nhut and was reorganized under the old squadron maintenance concept. Implementation of the squadron maintenance concept increased the 20th's strength from an authorized twenty officers and three enlisted men to an average of twenty-three officers and 280 enlisted men. The 20th performed its own aircraft maintenance, and manned an intelligence section at Udorn.

During the spring of 1966, approximately twenty per cent of the enlisted strength and sixty per cent of the officer strength was comprised of personnel assigned on a temporary basis. The pilots were of exceptional experience levels, with well over half of them holding the rank of Major or Lt Colonel. They manned twelve RF-101Cs until May of 1966, when an additional four RF-101s were authorized and quickly assigned. The additional RF-101s were sorely needed to help provide the 2nd Air Division with intelligence data. The 45th 'Polka Dots' had replaced the 20th at Tan Son Nhut and was flying a significant number of missions into the southern half of North Vietnam. These two RF-101 squadrons provided virtually all of USAF's daylight reconnaissance over North Vietnam. Most RF-4C Phantom II reconnaissance missions were flown at night and other tactical reconnaissance types lacked the performance to successfully operate over North Vietnam.

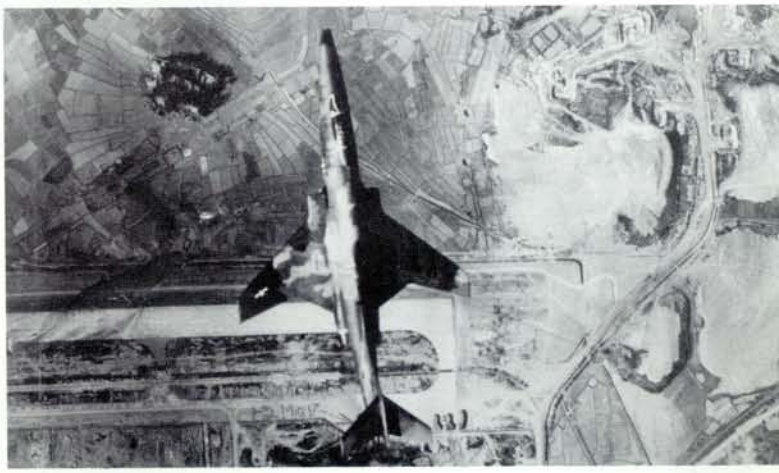
By June of 1966, the more experienced pilots began rotating back to the United States and their replacements were frequently lacking in recce experience. This placed a heavy burden on the remaining experienced pilots and a backlog of high threat reconnaissance targets developed. There were simply more targets than airplanes and experienced pilots. In a decision which is highly charged with emotion to this day, the 20th was directed from mid-June of 1966 to fly all missions into heavily defended areas as single aircraft sorties.

Although hundreds of solo missions had been flown into North Vietnam, most of them were conducted prior to the buildup of air defenses. Route packages 5 and 6 in the Hanoi/Haiphong area had been transformed into the most heavily defended airspace in history. Many high priority targets were defended by the full spectrum of air defense weapons: SAMs, AAA, and MiGs.

Reconnaissance pilots tried to avoid detection when possible, to remain out of range of the greatest number of defenses when detection was unavoidable and to attempt to confuse or evade the remaining defenses. Extensive radar networks and gap-filling ground observers made it virtually impossible to enter North Vietnam undetected. RF-101Cs were limited in speed (600 knots IAS) and it was impossible to avoid all of the guns. Flying into North Vietnam simply meant that you were going to get shot at. The communists thought they could beat the RF-101's warning systems and fired salvoes of SAMs at them. The best defense the Voodoo had against SAMs and MiG interceptors was early detection of the threat, and avoidance of same. The primary role of a wingman was to serve as the eyes and ears of the flight. A solo pilot had to navigate at speeds of from 480 to 600 knots, at altitudes right down on the deck, then find his target while watching for MiGs, SAMs and AAA. If he got shot down, there was no help available. No one to call for a rescue force. No one even to report his fate. Flying into Route Pack 5 or 6 with a wingman was a terrifying experience. Going in alone defied description.

Captain W Patrick Reaves deployed to Southeast Asia with the 20th TRS and flew a significant number of solo missions during his seven month tour. His 61st 'counter' (Mission U-833F, on 28 June 1966) was a BDA to the Viet Tri Bridge, eighteen miles northwest of Hanoi. The Viet Tri Bridge had survived several previous attempts to drop it, and at least one RF-101 had been shot down by the heavy AAA surrounding it. On 28 June Major James H Kasler led a flight of eight F-105s (Dodge Flight) against the bridge, with

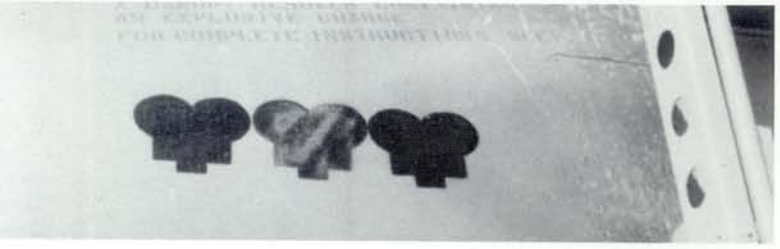
(Above) A 45th TRS 'Polka Dots' RF-101 parked in its revetment at Tan Son Nhut during May of 1967. (USAF)



(Above) RF-101s often operated in pairs over North Vietnam. This Voodoo was photographed by his wingman while he was photographing MiGs on a North Vietnamese airfield. (USAF)

(Above) RF-101C (56-166a) at Tan Son Nhut in May of 1967. It was one of the more durable combat veterans logging in 6,604.9 airframe hours. At one time it carried 'LUV BUG' and some rather suggestive feet painted on its nose (see color photo on page 25). (USAF)

(Above) RF-101C-65-MC (56-080) of the 45th TRS at Tan Son Nhut during April of 1967 carries the standard, but faded USAF SEA camouflage. The refueling probe doors on the nose have been opened prior to the probe being raised. (Norman E Taylor)



(Above) Camera mission markings below the windscreen on a RF-101.

(Above) The traditional windup to a successful tour of one hundred missions over North Vietnam included a 'wet down' in whatever was handy.

(Left) Congratulations from the Crew Chief on completion of one hundred missions over the North. Most pilots realized that the crew chief and his men deserved as much congratulations for the hundred missions, and perhaps more, than they themselves did.

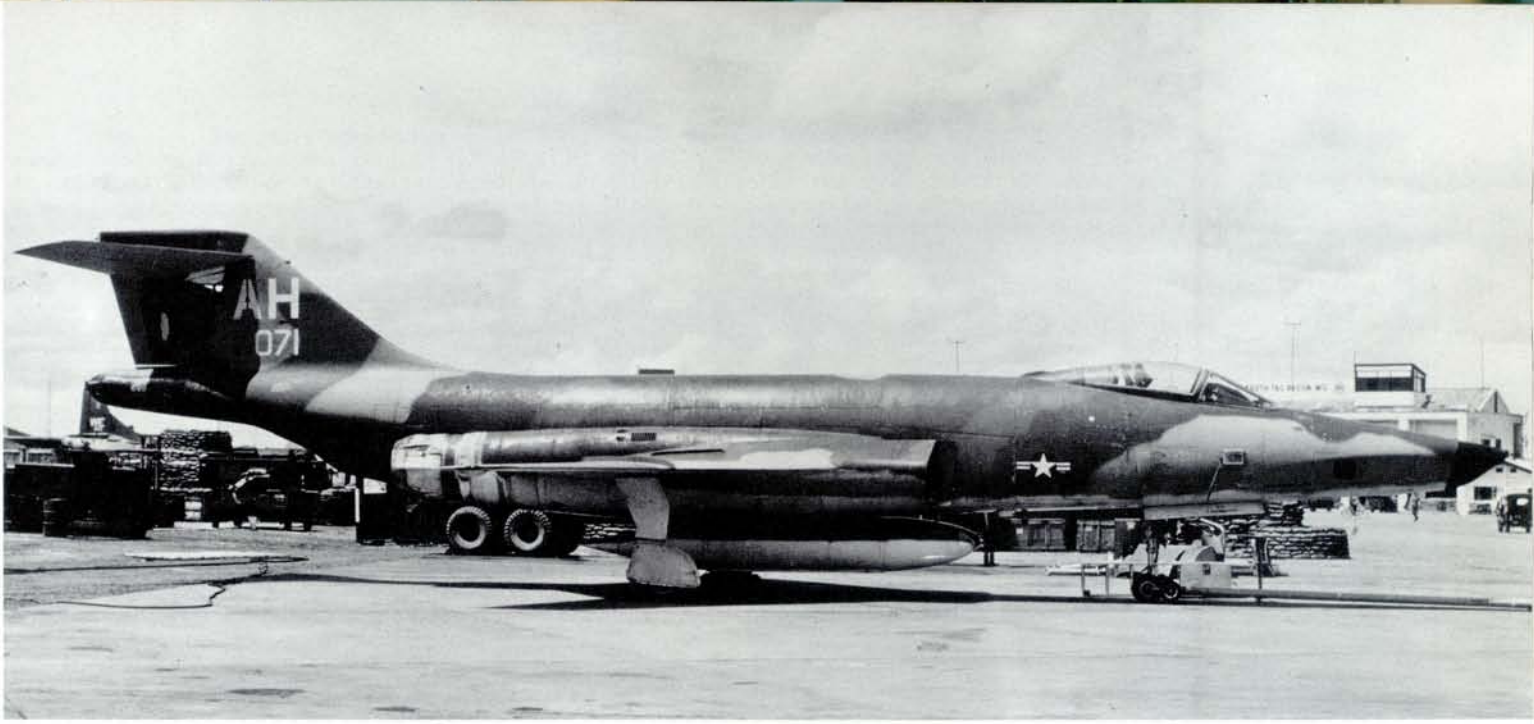
Reaves to follow a few minutes after the Thuds pulled off. It was one of the more memorable missions for all involved.

An alarm clock shattered the predawn tranquility of his hooch at 0430. Within 30 minutes Reaves was dressed and driving a squadron truck across Udorn on the red dirt road, headed for the tightly secured 20th Intelligence Office. In the office, an airman provided him with 1:250,000 scale maps of the target area. Symbols indicated that the target was surrounded by SA-2 missiles, and the latest Soviet radar directed 57mm and 85mm guns. The bridge was in a valley, eight miles from the cover of mountains, with eleven active SAM sites within a fifteen mile radius. Reaves was briefed with the latest available data, and went to work planning the details of his mission. He planned to cruise to Sop Hao at 15,000ft, fly northeast to a bend in the Black River at Tan Phong, then fly directly to the bridge at 50 to 100ft. He would do a 'burner pop' to 12,000ft, get his pictures, then dive for the deck and run like hell for home.

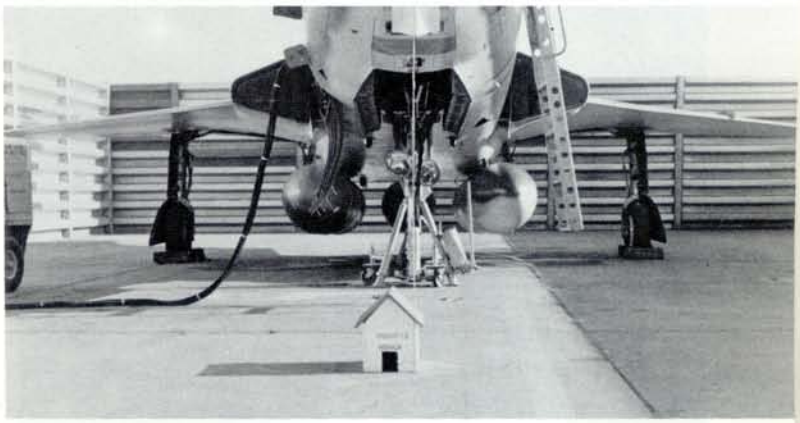
The duty officer helped Reaves into his survival vest and parachute. They checked the survival radios to make sure they worked, then Reaves loaded his forty-five automatic. He checked to make sure he had all his maps, took one last look at the previous target photos, then headed for his airplane. Unlike F-4 crews, 101 pilots wore all of their survival equipment on their backs (the parachute and survival kit are contained in the F-4 ejection seat). Weighed down as they were, 101 pilots had to be driven to the flightline and assisted into their aircraft.

Reaves' RF-101C (56-215) was ready to go, and he left the blocks on schedule. Lined up on the main runway, he did a final check, then lit the burners as he began to roll. He rotated at 185 knots, after a ground roll of 22 seconds, got the gear in the well, flaps up, and came back to military power for the climbout. He crossed the Mekong at 15,000ft, then an unforecast layer of clouds obscured the ground, making VFR navigation impossible. He continued on course, flying time and distance, and when his external tanks ran dry, he slowed down to punch them off. As the Thud TOT (time on target) slipped by, he called 'Dodge Flight' (Kasler) for the word. The code for 'target struck' was 'Pogo, and Kasler (better known as 'Yosemite Sam' because of his gruff voice) gave Reaves (whose call sign was Cadillac*) the word. When asked about flak over the target, Kasler replied; "All you want, all you want!"

**Call signs for pilots flying missions over Laos and North Vietnam were alternated daily. In the event a pilot was shot down, his call sign for that day was not used again until he was accounted for. This insured that, should he come up on a survival radio hours, days, or even weeks later, he would get immediate attention.*



(Above) RF-101C-65-MC of the 45th TRS at Tan Son Nhut AB, RVN during May of 1968. (Capt Robert Burgess)



(Above) 'Snoopy's Hooch' is not where the pilot of this 101 lived!

Cadillac continued until the clouds became broken. Looking down, Reaves spotted a river which was not familiar. He made a 360 degree turn over Laos, looking for familiar landmarks. Spotting none, he disgustedly headed back to his original IP (initial point). Back over the IP, he once again turned to his run-in heading to the target. He was now flying into the most highly defended airspace in history, above a cloud deck that hid the defenses, and robbed him of those few precious seconds of warning as SAM or AAA site opened up. Finally the clouds began to break, and he spotted the Y shaped junction of the Red and Black rivers. His target, five miles east of the the Y, was marked by a pall of smoke which 'Yosemite Sam' and his boys had left as their calling card. By now Reaves was down to 50ft, dodging through the hills at 540 knots, and heading for Viet Tri. He casually waved at a spotter who was shooting down at him from a hilltop post as the 101 blasted by**.

Reaves crossed the Y and pulled into a thirty degree burner pop. His RHAW gear lit up immediately, warning him of threats from every direction. The 101's ECM gear transmitted enough false information to fool most of the anti-aircraft weapons firing at him, and the shell bursts fell behind and wide of the climbing Voodoo.

The long nose of the 101 cuts forward visibility drastically, and as Reaves rolled left to look for the bridge under him, a tremendous explosion wracked the Voodoo and shrapnel rattled off it's skin. The airplane was still controllable, and he quickly rolled upright and checked for damage. The right wingtip was blackened and smoking, but relatively intact, but the right engine gauges were oscillating wildly, so he pulled the right throttle to idle. His main gyro had tumbled and the compass was spinning. He rolled over and dove for the safety of the deck, heading west.

A SAM passed behind him, and flak was now going off above him. Suddenly the RHAW gear gave him indications that an advanced SAM-3 site was looking at him. The SAM-3 was not supposed to be operational in North Vietnam, and he pumped a little harder. Without thinking, he reversed and headed directly at the SAM-3 site, hoping to get the first pictures of this new threat. The site commander evidently thought Reaves was attacking, and as the 101 got within minimum range, he shut down. Reaves could see the crew scuttling for cover as he flashed overhead with cameras rolling.

It had been a great morning with the cameras, but a reconnaissance mission is a failure if you don't bring the film home. Reaves had a long flight to make in a damaged airplane — without navigational aids or compass. The right engine seemed to be still running, so he advanced the throttle and headed for the hills as fast as he dared. He crossed the Black River and gradually nursed the shot-up Voodoo to 18,000ft, constantly watching for MiGs. He breathed a sigh of relief as the Mekong River slid under his wing and he crossed into Thai airspace. He declared an emergency, then made what turned out to be an uneventful straight in approach and landing. He was greeted by a parade of firetrucks and maintenance men, who checked the 101 for terminal danger before allowing him to taxi to the 20th ramp.

An evaluation of the BDA film showed that Yosemite Sam and crew had completely destroyed the Viet Tri bridge. Dodge Two had been hit, but had also made a safe emergency landing at Udorn. The films also revealed details of the SAM-3 site. The most difficult mission of Reaves' career ended at 0845, as most pilots were preparing for their first mission of the day.

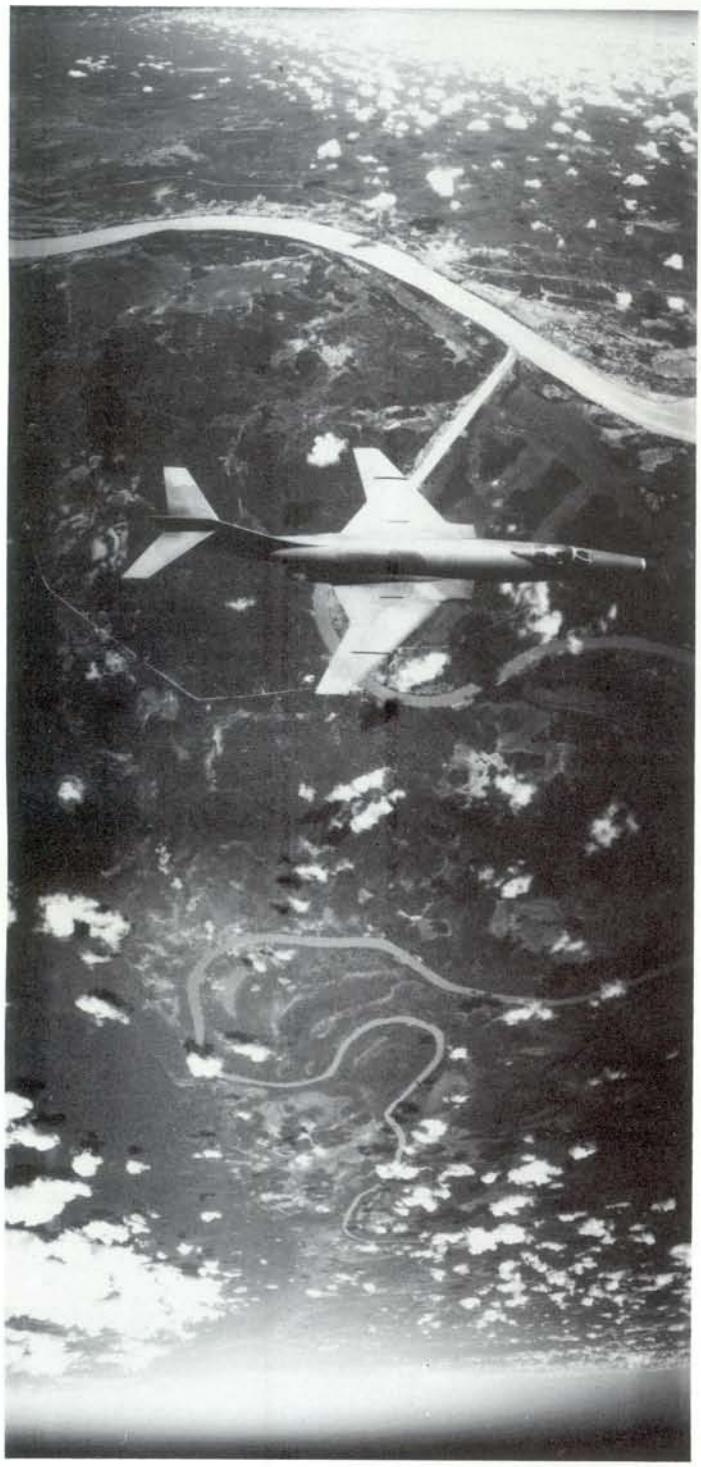
Captain Reaves flew into North Vietnam the following day, and had only one day off during the remainder of his tour. He flew thirty-two 'counters' during July, including three on the 4th, and flew combat on 55 of the last 56 days of his tour. He flew his 100th counter on 5 August, and went home the next day with 164 combat missions and 286 hours.

One of the most exclusive groups of combat pilots were RF-101 pilots who survived 100 missions over North Vietnam in 1966-67. Virtually every combat veteran that survived was returned to Shaw AFB as an instructor pilot when his tour was over. Their value became so high towards the end of this period that the last few missions for most were scheduled into the lower Route Packages to ensure their survival.

Solo missions into heavily defended areas of North Vietnam ended during August of 1966 after most of the 'old heads' had gone home. Unfortunately, some of the replacements had not been adequately prepared for what they would encounter over the Red River Valley, and this forced resumption of the two man flights. During solo flights, three reconnaissance pilots had gone out and disappeared without a trace. Years later it would be determined that one had died and two were POWs. The only solo pilot to go down over North Vietnam and return during this time was involved in a flying accident. He dropped too low during a low level mission, bounced off North Vietnam, and successfully ejected before his airplane disintegrated. Rescue forces found him while searching for the legendary Major Kasler.

***Without the aid of electronic navigational aids, pilots flying into North Vietnam were forced to rely upon prominent visual landmarks for navigation. The North Vietnamese were well aware of this fact, and established a network of spotters in bamboo towers along the known entry routes. These spotters alerted air defense forces to aircraft flying under radar. By mid-1966 it was virtually impossible to fly into North Vietnam undetected.*

Improving weather conditions over North Vietnam during the second half of 1966, combined with the resumption of two man flights made reconnaissance operations somewhat easier. No RF-101s were lost during September or October of 1966. During the early months of 1967 low clouds frequently prevented approaches to North Vietnam through the mountains. The RF-101s were forced to fly across Laos and South Vietnam to the Gulf of Tonkin, fly up the coast toward the target area, let down through the overcast, then turn inland for their photo run. They often broke out of the weather at 200ft, which was considerably under minimums. Flying above the clouds was too risky because SAMs were liable to pop out at full bore, when it was nearly impossible to spot them in time to avoid them. Besides, no useful intelligence could be gathered above the cloud.



(Above) Panoramic view (note horizon at both the top and bottom of the photo!) taken by the wingman of this 20th TRS RF-101C as it overflew the Mekong River in 1968. (USAF via Norman E Taylor)

The 45th TRS at Tan Son Nhut was flying more than half of it's missions into North Vietnam during the first half of 1966. Someone higher up noted this and directed that most 45th flights go to Laos or stay in South Vietnam in order to cut fuel costs and ease the demand on tanker forces.

The 1966-67 Christmas bombing halt was marked by very poor flying weather. Too poor, in fact, for the maximum reconnaissance effort that 7th Air Force wanted to document communist resupply activities. In spite of this, the RF-101s documented massive rebuilding, and roads, railways, streams, and trails were packed with every conceivable type of vehicle capable of carrying supplies into South Vietnam. During this time, RF-101s of the 20th often took off from Udorn, overflew North Vietnam, and flew directly to Tan Son Nhut where their film was downloaded, processed, and rushed via electronic transmission to Washington.

One of the camera updates had given RF-101Cs the capability of in-flight ejection of exposed film cassettes or in-flight processing of film. Both procedures had disadvantages which heavily outweighed the advantages gained. Neither practice saw widespread operational service, since the quality of in-flight processed film was at best marginal and made photo interpretation very difficult. The time gained by inflight processing was more than offset by the time required to interpret the poor quality pictures. And locating a cassette of ejected film usually took longer than the time required for the airplane to land and download the film conventionally, and a small error in timing could easily mean the loss of the entire mission film. Both procedures reduced the volume of film which could be carried, especially in the case of inflight processing.

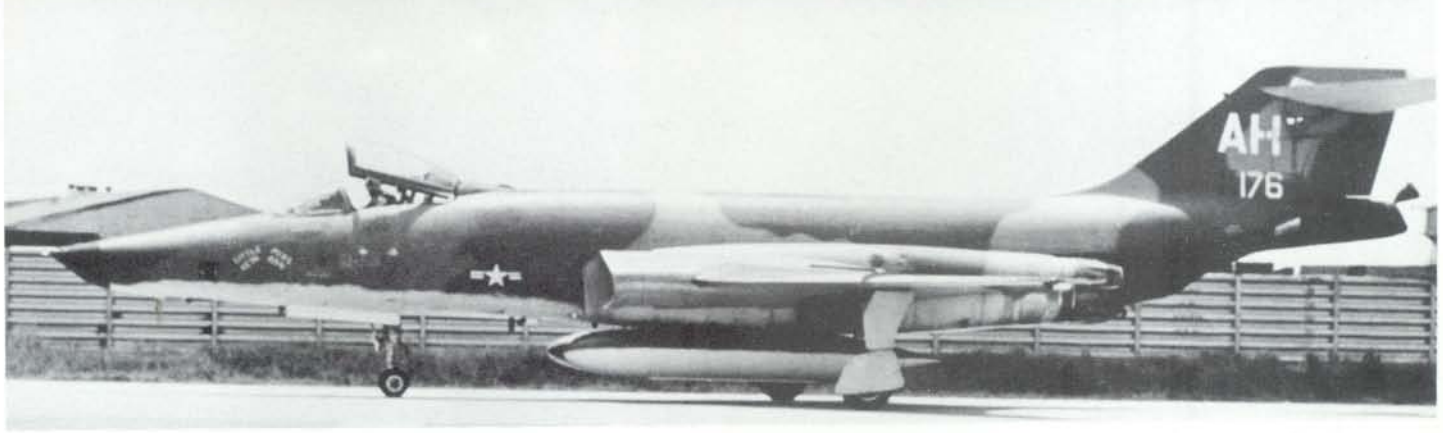
Modifications which improved survival or reconnaissance capability included installation of improved RHAW and ECM gear. In April of 1967 the 20th began carrying up to four ALQ-71 ECM pods on each airplane. This permitted 101s to resume flying medium altitude missions. The pods were effective, but weighed 400lbs and the drag was equivalent to two 450 gallon external tanks. Since the pods could not be jettisoned in flight, and they slowed the 101 down to the point where a MiG-21 could catch them at medium altitudes, fighter escorts were frequently provided for ECM pod equipped 101s flying into high MiG threat areas.

MiG-21s were not a serious threat to clean RF-101s at low altitude. The MiG-21 was deadly in it's element of medium to high altitudes, but suffered from stability and structural integrity problems above 500 KIAS at low altitudes. The most vulnerable portion of the RF-101 mission was the ten to fifteen seconds required to push over the top of a pop maneuver and accelerate away from the target. Many pilots stayed in afterburner and pegged the airspeed indicator at '0', which indicated 700 KIAS! They had no fear of exceeding the book Redline speed of 600 KIAS because McDonnell Douglas reps had assured them that it was safe to do so. The 600 KIAS Redline speed had been established prior to installation of wing stiffeners and rerouting of hydraulic lines. These modifications had been incorporated in the RF-101C, but the book was never revised — probably to save peacetime wear and tear on airplanes. Though RF-101Cs were marginally slower than speedsters like the F-4 Phantom II, F-104 Starfighter, and F-105 Thunderchief, they had speed advantages over each. The RF-101C could easily out accelerate the others, and carried enough fuel to sustain higher speeds for longer periods of time.

Unarmed RF-101s made tempting targets for the MiGs, and some F-4 fighter units tried to draw MiGs out by flying 101 routes, speeds, and altitudes. Sometimes they succeeded. Although MiGs had made periodic attempts to down RF-101s from 1965 on, they did not succeed until 16 September 1967. This loss resulted in the immediate withdrawal of all RF-101s from high threat areas of North Vietnam. Voodoos had been pulled out of the Red River Valley once before after a loss, but returned when it became obvious that no one else could do the job. It was different this time. The 14th TRS deployed to Udorn with brand new RF-4Cs and the 20th TRS stood down on 31 October 1967. It was a bittersweet day for the 'Green Pythons', who had flown virtually every daylight reconnaissance mission into the high threat areas of North Vietnam since arriving at Udorn during March of 1966. Most remaining aircrews were shifted to Tan Son Nhut, where they reinforced the 45th TRS.

The 45th, however, continued to fly a surprising number of missions into North Vietnam. There were three reasons for this:

1. There was just more reconnaissance work to do than there were RF-4s to do it.
2. RF-101Cs had the range to take off from Tan Son Nhut and photograph most recce targets in Southeast Asia without refueling. This gave the Voodoo a capability that the RF-4C did not enjoy. Air refueling was not always available on short notice and the airfields in Southeast Asia were always jammed with traffic which caused long delays in both take off and landing. Time is of the essence in reconnaissance, and one 45th RF-101C was always on alert, ready to fly 'hot' (directed from on high) missions.



(Above) 'LITTLE MISS BETH ANN' of the 45th TRS 'Polka Dots' at Tan Son Nhut on 10 October 1968. (USAF)

(Below) RF-101 of the 45th TRS landing at Tan Son Nhut with its drag chute deployed, 16 November 1969. (USAF)

3. Pentagon officials were enthralled with the high quality, large format (9x36 inch) photos from the big split vertical KA-1 camera, and frequently specified KA-1 sensors. By scrambling a 45th RF-101 after a hot target in Cambodia, Laos, North Vietnam or elsewhere, the officials could receive their photos from Tan Son Nhut within four to five hours after requesting them! (The photos were transmitted electronically, via satellite.)

A significant number of 45th TRS sorties were flown in support of the electronic sensor program over Laos during the summer and fall of 1967. RF-101s documented the exact location of sensor implants and followed up with frequent surveillance missions to check on their status. Facilities for developing and interpreting reconnaissance film became operational at Phu Cat AB, South Vietnam on 3 September 1967. 45th RF-101s frequently used Phu Cat to download film and refuel during shuttle missions between Tan Son Nhut and/or Udorn and Phu Cat. These flights usually included at least two recce missions over two or three different countries before returning to Tan Son Nhut during the same afternoon or evening for aircraft maintenance.

Most aircraft maintenance in Southeast Asia was performed in split shifts, early in the morning or during evening and nighttime hours when temperatures moderated. The midday sun could generate enough heat in airplanes parked outside to burn the exposed skin of maintenance men, who were the unsung heroes of 101 operations. They developed daily inspections to reduce the down time of phase inspections and frequently worked twelve and fourteen hour days under difficult tropical conditions.

A supply screw up threatened 45th TRS operations between October and December of 1967. Possibly associated with the 20th TRS phaseout, computer programs indicated there were no requirements for RF-101C spare parts at Tan Son Nhut, and badly needed spares were intercepted before they reached the 45th and returned to the United States. Several aircraft had to be cannibalized for spares before the costly error was discovered.

Major Roland Richardson and his compatriots in the 45th TRS experienced the 1968 Tet Lunar New Year offensive first hand. They had photographed significant increases in activity along the routes of infiltration into South Vietnam during December of 1967, and by mid-January they had begun to spot movements during daylight hours, which was highly unusual. Anticipating trouble, the two pilots who were standing alert, along with those scheduled to fly, spent the eve of Tet (30/31 January) sleeping in the 45th TRS Operations room. The remaining 45th officers were in their comfortable off base villa, which had been well stocked with provisions. Nobody was really surprised when the lunar fireworks was overshadowed by 80 and 122mm rockets at 0247 on the morning of 31 January. Within two hours Tan Son Nhut had been hit by 105 rounds of mortar fire and Viet Cong forces, reinforced by NVA regulars, overwhelmed the ARVN guards and poured onto the field. Lightly armed American Air Policemen and Army helicopter gunships met these forces head on and held them off until reinforcements were mobilized to help drive the invaders off the airfield. It had been close call, at least two North Vietnamese regulars and a Viet Cong were killed in the 45th's squadron Area.

Fortunately, a significant number of the communist rockets were duds which failed to explode. Two unexploded rounds were found in the roof of Wing Headquarters and another was stuck in the concrete between two RF-101s. Energy absorbing sand filled steel revetments housing the parked RF-101s saved countless aircraft. As it was, several RF-101s were damaged.

South Vietnamese guards at the 45th's villa abandoned their post and the pilots were left to defend themselves. They donned flak jackets and helmets, grabbed M-16s or 45s and headed for the roof. They took cover behind the building's cement perimeter wall and watched for intruders as the deadly airshow took place around Tan Son Nhut. By mid-morning there was a lull in the fighting and the pilots drove a truck back to Tan Son Nhut past some trigger happy security guards. Since the 45th's enlisted men lived on base, they had spent the night servicing their 101s. Consequently, most of the Voodoos that had been damaged by mortar fire had already been repaired and serviced, and were ready to fly. The main runways had not been damaged, but were unusable because of litter and spent shrapnel which created a major FOD problem.

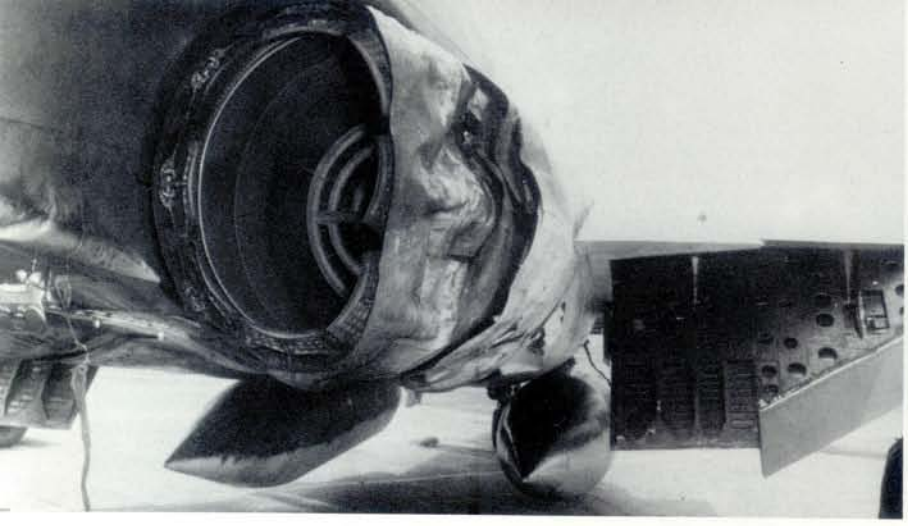
The 45th was able to fly as scheduled by using a short, auxiliary runway. Captain John Franklin was climbing aboard his RF-101 when a bullet passed so close to his hand that he felt the heat as it ventilated his cockpit. A shaken Franklin picked himself up off the concrete, got into another airplane, and flew the mission as briefed!

Major Roland Richardson drew the assignment of acting as a mobile control officer, in an open bunker between the runways, as fire fights raged nearby. He was a lonesome airplane driver without an airplane in no mans land. The following day (1 February 1968) he got back into the cockpit for two very memorable missions.

I had one of the first missions of the day and had to be at the squadron by 0645. Getting up was no problem because we had spent a second sleepless night on the roof of our villa in full battle gear. We were all a little spooked because we had spotted someone in the shadows, and exchanged fire with them. At least two rounds had penetrated the walls of our villa and spent themselves in the mattress of a pilot who was on leave in Bangkok.

My first target was the junction of Highways 547 and 548 and the two bridges near Con Tom, South Vietnam, in the A Shau Valley. The A Shau is a deep crack between two mountain ranges running north and south just inside South Vietnam. The floor was protected by 2600 to 5800ft mountains on the east side and a natural refuge for infiltrators heading south and had been heavily traveled since we gave up our last base camp there during March of 1966.

There was still debris on the main runway, so I was directed to take off from mid-field on the near runway. I lifted off at 0850 as 'Polka Dot 22' in 042, and stayed in burner longer than usual to get away from the field faster. There was a fire fight going on right alongside the field as I took off. I leveled



(Above and Left) RF-101Cs (56-217) and 56-168) were involved in an air-to-air collision over Vietnam on 30 April 1969. Both aircraft sustained major damage, but it is a testament to the Voodoo's toughness that they both made it back to base, and after extensive repairs, both returned to action! (USAF via John Jacobs)

off at 17,000ft and turned north toward Pleiku and Ban Me Thuot. The A Shau Valley is off the right wing on a heading from Pleiku to Khe Sanh. The whole area was covered with clouds, as expected, but I could make out the Rao Lao River through a tiny hole in the clouds. I couldn't see the target very well but picked up the Rao Lao and pressed on. Luckily, through another hole, I spotted what was left of Ta Bat Airfield and went down. I rolled out over the bombed out bridges with my KA-1 split verticals running and completed the first portion of the mission. The briefing also called for forward oblique and six inch pan camera ('little lookers') coverage of the target area. There had been no ground fire, but I had alerted the enemy to my presence and really needed to find another way into the valley for my next run.

I flew west into Laos and looked for a hole in the clouds so I could get down and follow the Rao Lao into the A Shau through a big gap on the Laotian side. This area is high country and you have got to be careful. I milled around for quite awhile before I found a hole and was able to get back down to the river bottom. The visibility was not red hot as I snaked through the Laotian entrance. I was thundering along at about 500 KIAS as I passed Ta Bat and turned south along the Rao Lao toward my target near Con Tom, where highway 548 crosses the river. It was dark under the overcast and I could clearly see tracers arcing up behind me in the rear view mirrors. I plugged the burners in and quickly climbed up through the clouds near Kontum and headed west toward Danang. Near Danang I turned south and landed at Phu Cat after a two hour mission at 1050.

I went to lunch after the usual debriefing and returned to learn my film had been printed and accepted. They had my targets ready for the afternoon mission. Sure enough, it was to the A Shau Valley, in the same airplane, but this time as 'Polka Dot 35'. My targets were the three bombed out airfields located at either end of the valley and Ta Bat near the center.

I took off at 1330 and again headed for the A Shau, via Pleiku at 15,000ft. The clouds were thinning somewhat and I was able to spot the Tam Ka Ta River, which will lead you into the south end of the A Shau if you can see well enough to follow the right route. Visibility permitted me to follow the Tam Ka Ta to the Tam Rang River leading toward South Vietnam. The Tam Rang leads to a small trail which crosses into a smaller valley and over a high ridge right by the A Shau airfield. I came down the trail, not too fast, because I'm in and out of the clouds at 300 to 400 feet...really scud-running. My biggest problem is altitude, because I am running below the 'little lookers'' effective operating range. Fortunately, the clouds lifted a little as I crossed the ridge into the much deeper A Shau Valley, and climbed towards a patch of blue with the little lookers running. I punched back down after the airfield crossed through the viewfinder and accelerated to 480 or 500 with the tanks on. I did a couple of jinks along the valley floor and spotted where Ta Bat should be. They hadn't shown me any gun laying radar, so I rolled out on a heading toward Ta Bat and pulled into the heavy clouds to hide. I punched back down and corrected my heading for the airfield. I had a fair amount of altitude over Ta Bat (4,500ft), which was now open, but I immediately ran back into the clouds and started skipping through the tops after my photo run. I had to get back down under the clouds for the last target, and snapped back down to a radar altimeter reading of 2,000ft, which is a little low. I broke out among the knobs and was drawing heavy fire from both sides of the valley, but fortunately, it was trailing me. I made a couple of breaks hard enough to pull streamers while approaching the A Luoi airfield and made an abrupt climbing turn toward the water side of South Vietnam after shooting the airfield with 'little lookers'. The hole at Ta Bat was still open, so I shot it with KA-1s and headed back to Saigon for a few flightlines before landing.

They wanted daily flightlines of Saigon. Instead of tying up airplanes doing nothing but flightlines of Saigon, we divided the city into numbered flightlines and took turns running them at the conclusion of a mission as film and fuel permitted. We would slow down to 200 KIAS and shoot them at 5,000 to 8,000 feet with full flaps, using the KA-1 Split Verticals. Operations kept a running score of which flightlines were needed and advised us when we checked in with them while returning from a mission or a test hop. We gave them good results.

(Above) 'THE IRON EYEBALL' parked outside of the Quonset hut like protective shelters at Tan Son Nhut, during May of 1970. These shelters provided more effective protection from attack, especially mortar attack, while allowing ground crews to maintain the airplanes in the shade and out of the torrential rains. (USAF)

The pilots got into the habit of 'crashing' early in the evening because the predawn hours frequently belonged to 'Charlie'. Nightly fire fights and/or mortar rounds became a way of life. A well-placed mortar round destroyed an RF-101C on 18 February, with eight additional aircraft being damaged during the attack. There were no spare RF-101Cs to be had and USAF couldn't afford to lose anymore. And, since mortar rounds continued to impact on Tan Son Nhut five RF-101s were flown to Phu Cat every night as a precautionary measure. This practice was discontinued after a mortar attack on Phu Cat damaged two RF-101s on the night of 11 May. The RF-101s were eventually moved into reinforced concrete and steel structures at Tan Son Nhut which protected them from mortars and provided badly needed shelter for the maintenance men.

The Tet Offensive had a profound effect on the lives of aircrews based at Tan Son Nhut. Gone was the nearly 'tourist' atmosphere of living in Saigon. Travel to such places as the commissary and main PX in Saigon were now restricted to groups wearing full battle gear, and trips into 'tough' sections of the city were out of the question. All reconnaissance crews based at Tan Son Nhut were required to move from their comfortable villas to primitive tin sheds on base, which further aggravated living conditions. As luck would have it, the officer flight crews were concentrated in a small area they referred to as 'ground zero'. A few well aimed mortar shells falling amongst these tin sheds would have wiped out many of the aircrew, and crippled EC-47, RF-4C, RB-57 and RF-101 reconnaissance operations. Lack of sleep from frequent shellings, daily combat missions, poor living conditions, and the hot, humid weather combined to take a heavy toll on the airmen. In spite of this, the 45th flew every mission 7th Air Force scheduled for it during Tet.

45th RF-101s provided photographic warnings of the North Vietnamese buildup around a strategic plateau in the northwest corner of South Vietnam that was destined to become notorious. General Westmoreland decided to hold Khe Sanh at all costs, since it sat astride one of the most important infiltration routes out of Laos and into South Vietnam. The garrison at Khe Sanh was surrounded by North Vietnamese, and shelled murderously. From mid-February until mid-April, tactical aircraft flew an average of 300 sorties in support of Khe Sanh, preventing the communists from taking the combat base. At the end of the siege, the North Vietnamese had lost the equivalent of two divisions, largely to airpower. The success of airpower was due in large measure to the effective photo and electronic reconnaissance provided by USAF.

After Khe Sanh, emphasis turned to 'OPERATION TURNPIKE', which was a truck-hunting exercise. RF-101s helped search for truck parks and convoys which were then struck by tactical aircraft. Reconnaissance emphasis turned from South Vietnam to Laos and North Vietnam during mid-1969. Major Miles D Harlow gained the dubious distinction of being the last RF-101 pilot to be shot down in Southeast Asia on 7 August 1968. He encountered heavy AAA fire over the DMZ and took a hit behind the cockpit which damaged his hydraulics. Harlow was forced to punch out at 20,000ft over the Gulf of Tonkin when his Voodoo (56-215) pitched down. He was injured during the negative G ejection, but rescued from the Gulf.

RF-101s flew into North Vietnam with fighter escort until March of 1969. After 4 March they operated to 17 degrees, 15 minutes north without fighter escorts (if above 15,000 feet) but retained escorts beyond this line. Many of these missions were directed at routes of communication (Highways, railroads, waterways, and trails) between the A Shau Valley and the panhandle area of North Vietnam. They were flying daily missions into North Vietnam searching for new SAM sites, truck parks and targets of opportunity.

13 October 1969 signalled the beginning of the end of RF-101 operations. The reconnaissance shop at Phu Cat closed up and returned to Tan Son Nhut. Phu Cat and Danang were subsequently used for stops, but closing the Phu Cat recce shop significantly reduced the number of flights into North Vietnam. RF-101 aircrew ratio was reduced from 1.35 to 1.2 crews per aircraft. The 7th Air Force ordered a reduction in the 45th TRS alert force to one RF-101 and pilot as an 'economy move' on 19 April 1970, further reducing RF-101 sorties into North Vietnam.

For purposes of comparison, 45th pilots frequently completed 100 'counters' and went home early (early was anything less than the normal twelve month tour of duty) during 1967 and portions of 1968. Major Roland Richardson completed 100 'counters' on 20 August 1968 and went home with 198 missions and 418 combat hours. Major John Jacobs flew only 41 'counters' between July 1968 and June 1969 during his one year tour. His 159 missions ranged in length from 55 minutes to 3:30 minutes and averaging 2:15, and totalling 346 hours. Major Jacobs replacement flew less than 20 'counters' during his twelve month tour. All pilots of the 45th bemoaned the fact that they had photographed all of South Vietnam many times over, but it was absolutely impossible to satisfy the appetites of Army field commanders for KA-1 area covers. 45th RF-101s frequently averaged more than one sortie per aircraft per day during 1970, until they finally stood down on 1 November 1970. Their tired old RF-101Cs were reassigned to Col Sam Forbert's 186th TRG at Meridian, Mississippi.

USAF had wanted to phase out its SEA based RF-101s for some time, but had bowed to pressure from the Army and certain Pentagon officials to keep the 'Polka Dots' operational. Keeping the 45th TRS in Southeast Asia required maintaining two additional RF-101 squadrons at Shaw AFB for aircrew support. These two squadrons eventually checked out Air Guard pilots in the 101, and turned their airplanes over to Michigan Air Guard.

RF-101Cs flew approximately 35,000 'operational training' clandestine combat sorties. 9,000 sorties went to Laos, 10,000 to North Vietnam, with the remainder flown over South Vietnam. Twelve RF-101 pilots were KIA, ten became POWs, with nine of these being released in 1973. Thirty-nine RF-101s were lost in combat, and several more bit the dust in operational accidents.

F-101B VOODOO INTERCEPTOR

Air Defense Command first expressed an interest in an interceptor version of the F-101 Voodoo as early as October of 1952, but was turned down by USAF on the grounds of expense. Not easily deterred, ADC proposed in April of 1953 that an interceptor version of the Voodoo 'might' be suitable for use on the perimeter of the United States in areas where radar surveillance was less than satisfactory. With ADC keeping up the pressure for an interceptor Voodoo, Air Research and Development Command (ARDC) conducted a competitive study between the Northrop F-89F Scorpion, the North American F-100B Super Sabre and the McDonnell F101B Voodoo during 1954. The Voodoo won easily, outscoring the competition in every category. However, it was not until February of 1955 that McDonnell was given the go ahead, by which time the two seated configuration had won Air Force favor over the single seated version.

The two seated F-101B Interceptor program proceeded with a proven, but inadequate, fire control system from the Northrop F-89J Scorpion, and state of the art avionics. As Convair's 'ultimate interceptor', the F-106 Delta Dart, fell far behind schedule it was proposed that the F-101B be equipped with the advanced MA-1 weapons system which had been developed specifically for the F-106 program, but when this was rejected on the basis of cost the MG-13 weapons system, an updating of the Scorpion E-6 system was installed. The system fired variants of the AIR-2 Genie and/or AIM-4 Falcon air to air missiles carried on a rotary door installed on the underside of the fuselage just behind the nose gear door. Strakes were added to each side of the fuselage just outboard of the weapons door to prevent interference with the air going into the engine intakes and to prevent weapons gasses from entering the intakes. The AIR-2 Genie missile, weighing 837.7lbs, was armed with a nuclear warhead and was normally carried in pairs. The AIM-4 Falcon missile, also normally carried in pairs, weighed 133lbs, and was conventionally armed. The rotary weapons door could accommodate two AIM-4s externally and two AIR-2As internally. The F-101 interceptor was thought of as a stop gap, which would fill the needs of Air Defense Command until the F-106 became operational, and thereafter acting as a backup.

The F-101B prototype (56-232) was first flown at Lambert Field on 27 March 1957, almost a year behind original estimates. It encountered many of the same problems that had plagued the earlier F-101A program, plus a few more of its own. An increase of almost 5,000lbs in empty weight compounded tire failure, and degraded overall performance. Because of the additional weight the wheel and tire size were increased causing a bulge in the undersides of the wings. Most of the basic aerodynamic problems were solved quickly, since the F-101B was essentially similar to the F-101A aft of fuselage station 417 and benefited from the basic F-101A flight test program. The F-101B was a thoroughly flight tested aircraft by the time it was finally allowed to enter operational service with the 60th Fighter Interceptor Squadron (the designated test squadron) at Otis AFB, Massachusetts on 5 January 1959, some eighteen months behind schedule.

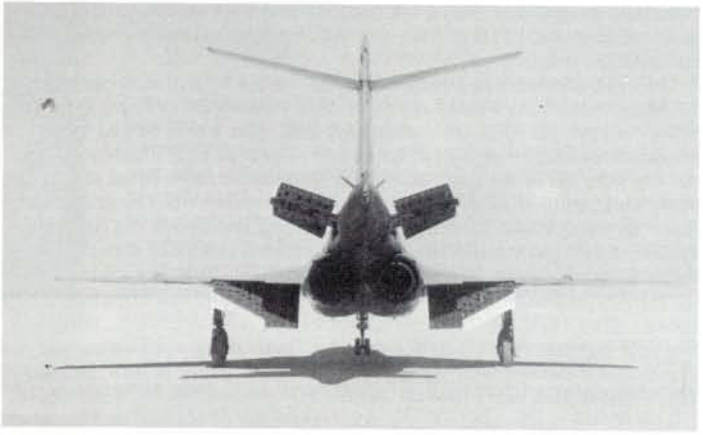
Early plans called for as many as 651 F-101Bs, but this number was reduced to 480 during 1956, and by the time the 101B entered service, USAF had decided to stretch out deliveries on those. Six F-101Bs were delivered in 1957, 43 in 1958, 213 in 1959, 207 in 1960, and a final 11 in 1961. They were used to equip seventeen ADC squadrons during 1959 and 60.

Air Defense Command Squadrons equipped with F-101B Interceptors during 1959

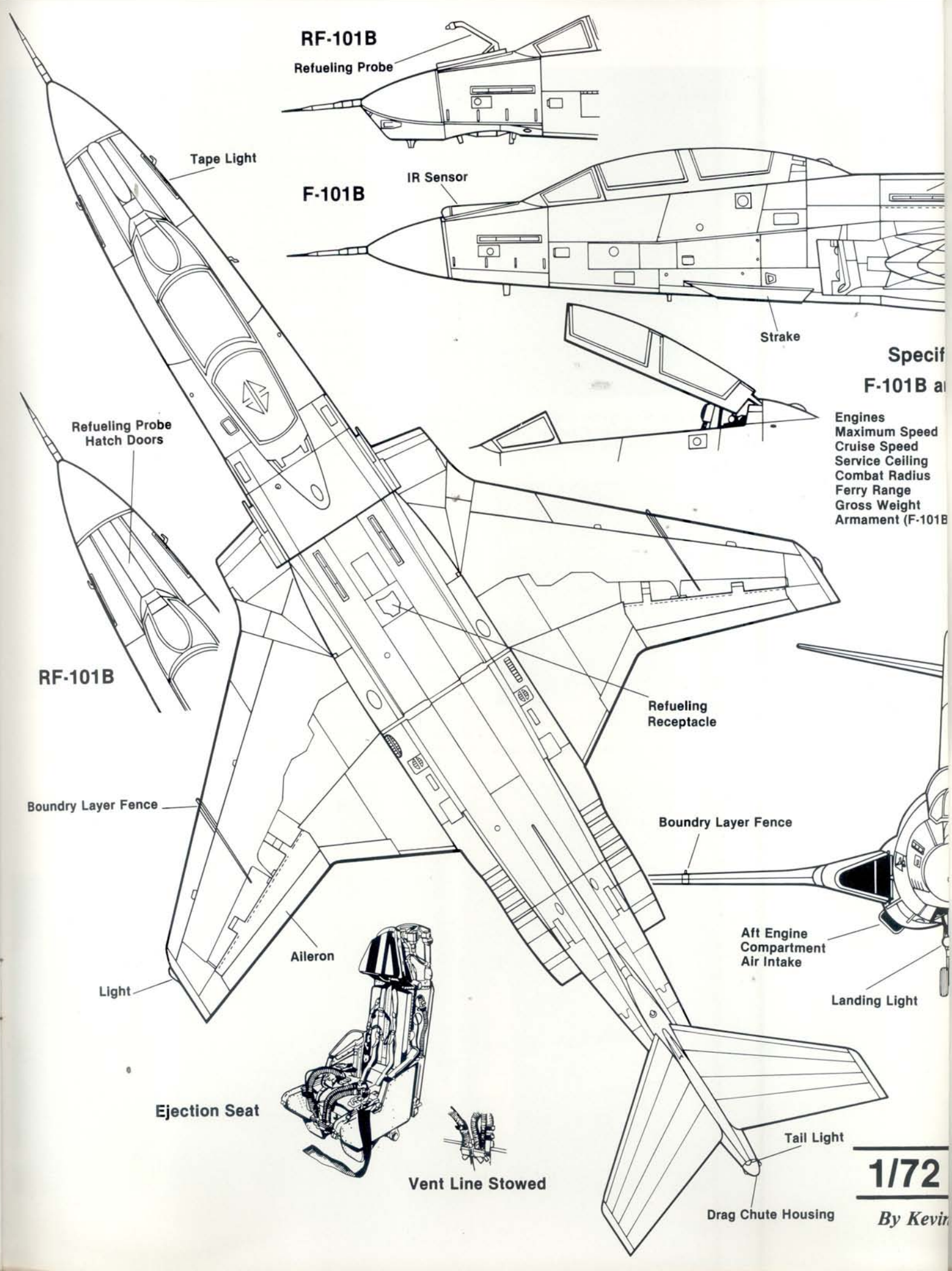
Unit	Base	State	Received 1st Aircraft	Phaseout
60th FIS	Otis AFB	MA	Feb 59	Apr 71
98th FIS	Dover AFB	DE	Jun 59	Jul 68
84th FIS	Hamilton AFB	CA	Jun 59	Jul 69
322nd FIS	Kingsley Field	OR	Jun 59	Oct 69
13th FIS	Glasgow AFB	MO	Dec 59	Mar 68
75th FIS	Dow AFB	ME	Dec 59	Mar 68
2nd FIS	Suffolk County AFB	NY	Dec 59	Oct 69
62nd FIS	K I Sawyer AFB	MI	Dec 59	Apr 71
49th FIS	Griffis AFB	NY	Dec 59	Jul 68
445th FIS	Wurtsmith AFB	MI	Dec 59	Sep 68
During 1960				
437th FIS	Oxnard AFB	CA	Jun 60	Apr 71
444th FIS	Charleston AFB	SC	Jun 60	Jul 68
15th FIS	Davis Monthan AFB	AZ	Jun 60	Dec 64
29th FIS	Malmstrom AFB	MO	Jun 60	Apr 68
18th FIS	Grand Forks AFB	ND	Jun 60	Apr 71
87th FIS	Lockbourne AFB	OH	Jun 60	Jul 68
83rd FIS	Hamilton AFB	CA	Aug 60	May 63

(Above) An early F-101B (56-0247) Interceptor at the Air Force Flight Test Center, Edwards AFB, California on 13 April 1959 during the flight test program. The F-101B was the most thoroughly flight tested Voodoo to enter operational service. (USAF)

F-101B (56-0235), one of the first six interceptors built was modified for project 'Life Line', in which tests by USAF Aeronautical Systems Division at Wright Patterson AFB proved that pilots forced to bail out of a damaged aircraft would not collide with their ejection seats. A 50ft long nylon line attached to the cockpit floor prevented the seat from following the pilot after ejection. (Peter Bowers M Collection).



(Above) F-101B with speed brakes and flaps out. (USAF)



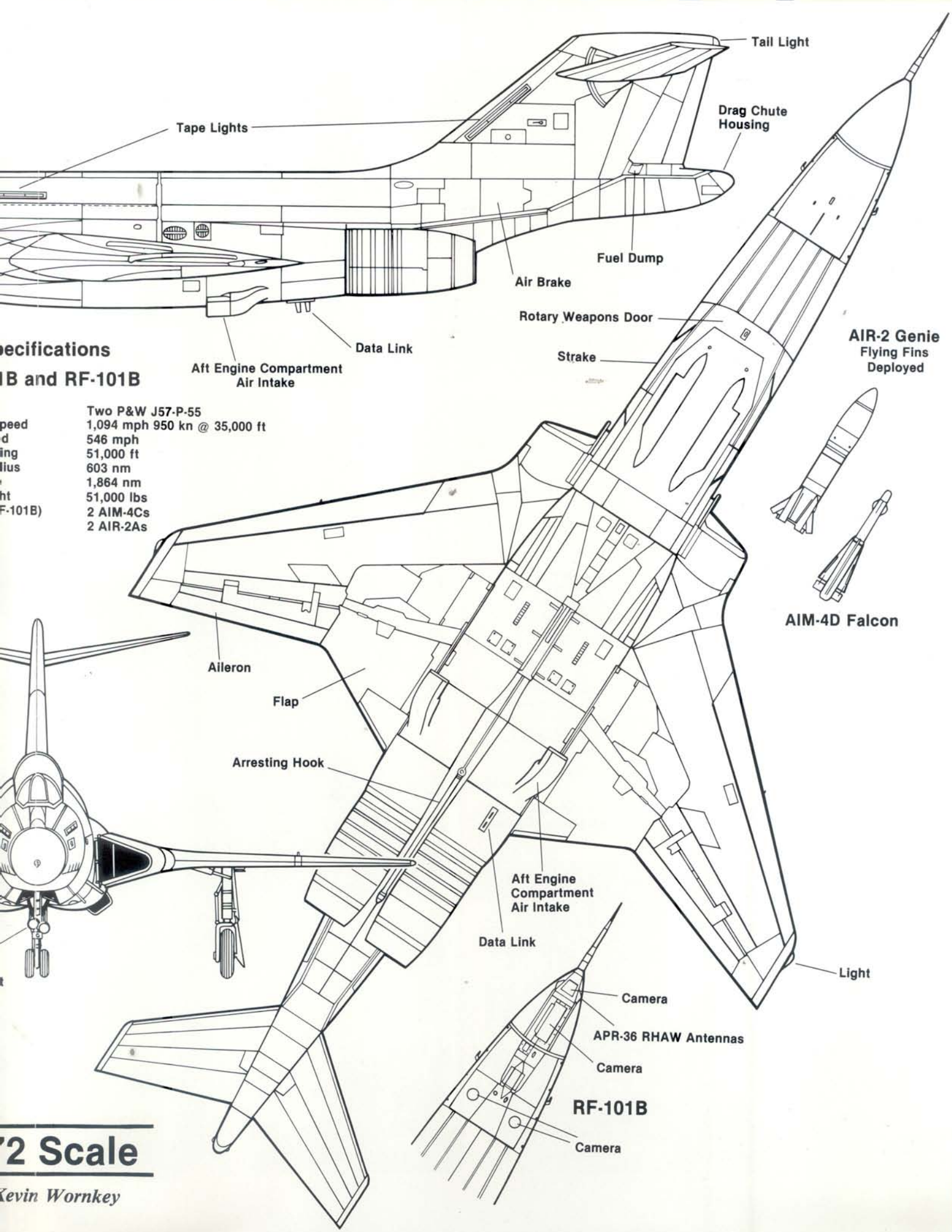
Specif

F-101B a

Engines
Maximum Speed
Cruise Speed
Service Ceiling
Combat Radius
Ferry Range
Gross Weight
Armament (F-101B

1/72

By Kevin



pecifications

1B and RF-101B

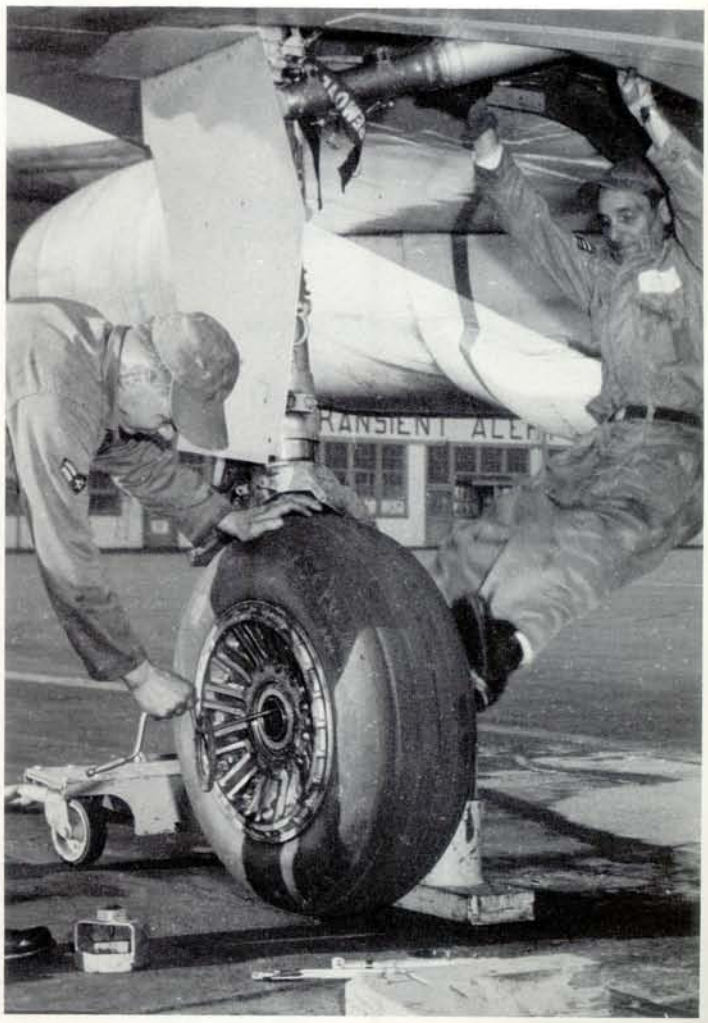
peed	Two P&W J57-P-55
d	1,094 mph 950 kn @ 35,000 ft
ing	546 mph
lius	51,000 ft
	603 nm
ht	1,864 nm
F-101B)	51,000 lbs
	2 AIM-4Cs
	2 AIR-2As

'2 Scale

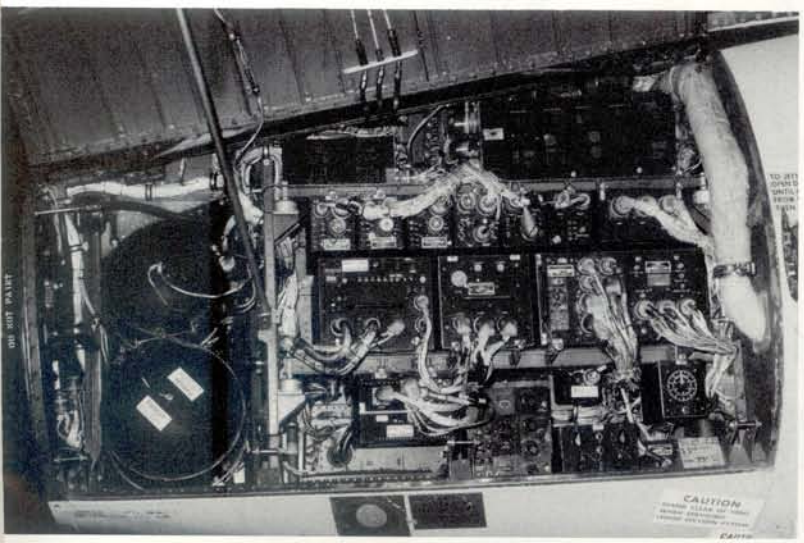
Kevin Wornkey

(Above) F-101B armed with a pair of AIM-4D missiles. The increase in weight of the B model required wider tires, and since McDonnell and USAF could not agree on who would pay for redesign of the wing, the compromise was a distinctive bulge on the bottom of the wing. (Gen Wayne C Gatlin)

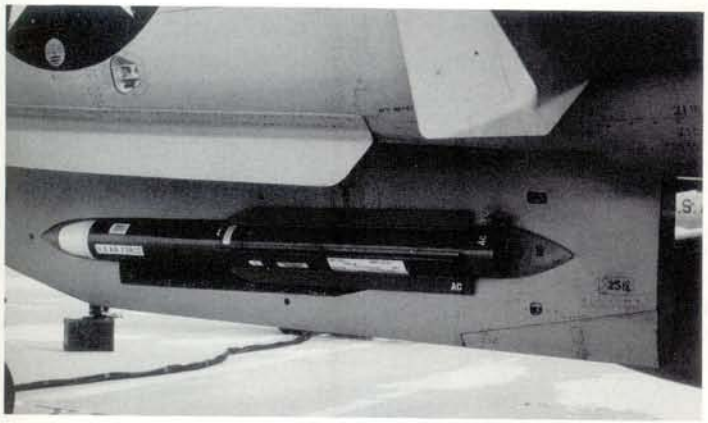
(Right) Tire failures had resulted in a number of fatal accidents on earlier models, but the larger wheels on the F-101B, along with improved tires and tubes virtually eliminated these failures. Changing wheels and tires, however was a tough job, which could be dangerous if not done properly. (USAF)



(Below) The M-13 fire control system of the F-101B underwent continual updating throughout its service life, becoming more accurate and more reliable. (Paul Stevens)



An early test F-101B Interceptor carrying MB-1 Genie nuclear armed missiles at McDonnell Aircraft Company, Lambert Field, St. Louis. The tail fins on the Genie were retractable for internal storage. (USAF)



(Above) The body of this AIM-4 Falcon missile is painted Dark Metallic Blue with White tip, lettering, and labels.

These seventeen squadrons had a wide range of recent interceptor experience, six having flown the F-86, seven the F-89, three the F-102, and one the F-104.

However, the dean of all F-101B units was at Tyndall AFB, Florida, which has since been renamed the Air Defense Weapons Center (ADWC). The premier 101 interceptor unit was the Tactical Aerial Target Squadron (TATS) formed in 1958. It was charged with training aircrew, providing target tugs, ECM training for ADC crews, and maintaining test aircraft which were used to develop and refine interceptor tactics and weapons. It operated a number of Voodoo interceptors with the first one arriving in October of 1958.

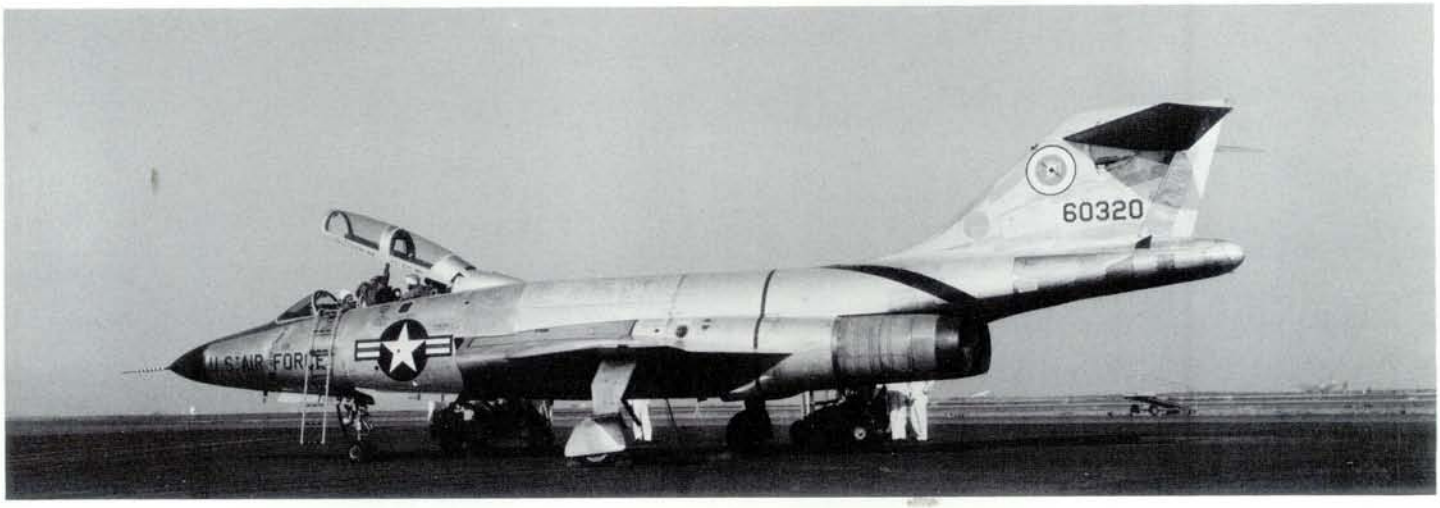
Also located at Tyndall was the 4756th Combat Crew Training Squadron (CCTS) which operated a multitude of ADC aircraft and provided training for radar observers, carried out pilot and instructor up-dates, reviewed and updated Voodoo flight and weapons manuals, and provided support for the Air Defense Weapons Center. ADWC is now host for the bi-annual William Tell Weapons Meet, which pitted the best crews from various ADC units against drone targets and each other in tests of operational skills.

ADC was initially somewhat disappointed with the overall performance of its F-101Bs. Pilots had heard hairy tales of the 'pitch up' phenomenon and many were less than enthusiastic about flying the new aircraft. Maintenance men had their hands full, and Supply Officers were appalled with the Voodoo's appetite for unlikely spare parts and the difficulties in acquiring them. But experience with the big interceptor was a confidence builder for aircrews, who soon learned that they could safely and successfully perform their mission, simply by flying 'by the book'; and maintenance men who came to appreciate the multitude of access panels which gave them easy access to most field level maintenance requirements.

Supply problems were addressed by the Air Materiel Command Inspector General, who organized a high level commission to investigate and develop solutions to supply bottlenecks. Improved availability of ground support equipment, bench and hydraulic test stands, coupled with several engineering modifications performed at field and depot level greatly improved the hydraulics situation. Improved supply, adequate support equipment, and increased experience levels of air and ground crews quickly improved the quality of 101 interceptor operations. By December of 1960 all but one F-101B unit was considered combat ready. The Voodoo was well on its way to becoming the cornerstone of ADC operational excellence.

An eighteenth squadron, the 449th FIS, was to have been formed on F-101Bs in March of 1960 and stationed at Ladd AFB, Alaska. Spares and ground equipment had been delivered to Ladd and nine Voodoos were at Hill AFB awaiting pick up by Alaskan Air Command pilots when the project was cancelled by the Air Force without explanation. Kevin Keaveney has pointed out that three years later this decision came back to haunt USAF when three high performance Soviet Aircraft had an "uninterrupted flight through Alaskan coastal airspace".

(Below) The F-101B could carry two nuclear AIR-2 'Genie' unguided ballistic rockets. The Genie was nine feet seven inches long and had a launch weight of 820 lbs. (Charles B Mayer)



(Above) Hamilton AFB's record breaking 83rd FIS was the last operational unit to receive F-101Bs, in August of 1960, but they quickly established themselves as one of the finest. By the time they ceased operations on 3 May 1963, they had won both an ADC 'A' award, and the highly coveted Hughes Trophy. 18 September 1960 (William T Larkins)

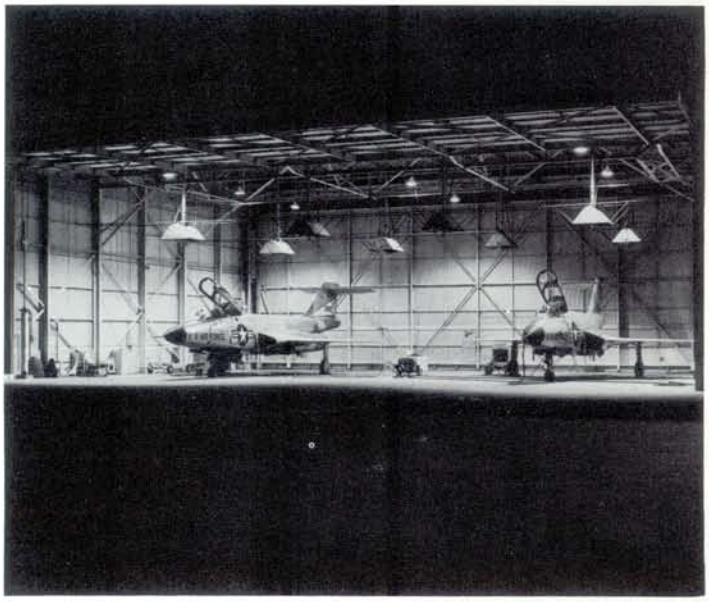
(Above) F-101B (57-0299a) of the 322nd FIS was one of several 101s damaged in departures from runways during landing. The aircraft was repaired and after additional USAF service it eventually went to Canada. (USAF)

(Below) An interceptor crew heading for their airplane.

(Below) Since the Soviet manned bomber threat was seen as coming over the pole, most Air Defense units were stationed along the northern border of the US. Carrying out the all weather intercept mission meant 'scrambling' in some pretty severe weather.

(Above) F-101B-95-MC of the 60th FIS with the weapons door rotated to an open position. May 1965. (Roger Besecker)

(Below) F-101Bs of the 437th FIS at Oxnard AFB, CA. The lower surfaces of the rear fuselage was skinned with heat resistant titanium and left unpainted. The small fin like appendage just below the rudder was the fuel dump.



(Above) Hamilton AFB, CA was one of the most sought after assignments in Air Defense Command, and the 84th FIS benefited from this by having its pick of pilots. Birds were kept ready to go in these 'alert barns'. (Douglas D Olson)

(Below) F-101B of the 29th FIS out of Malmstrom AFB, Montana, 1966. The air brakes are partially deployed. (Lt Col Marion H Havelaar)

Dual Control F-101F

Original F-101B production plans called for twenty-five per cent of the Interceptor fleet to be equipped with dual controls. These dual control F-101Bs had a partial second set of controls in the rear cockpit, with minimum engine instrumentation. However, no provisions were made for operating the landing gear, flaps, speed brakes, or for deploying the drag chute, start or shutdown of the engines, or for controlling afterburning (hence, no backseat heroics in the case of a disabled pilot!). They were not considered full fledged trainers, and were simply referred to as 'duals'. Fiscal Year 1956, 1957, and 1958 F-101Bs were modified with dual controls by McDonnell from retro-kits after the airplanes were manufactured. However, FY 59 F-101Bs were equipped with dual controls during final assembly and were subsequently designated F-101Fs. Early production aircraft that had been fitted with with dual controls had been simply noted by an asterisk, and a one digit increase in their block numbers. This apparent discrepancy in nomenclature came to light during QUEENS ROW negotiations with Canada. As a result, all existing ADC F-101Bs with dual controls were redesignated F-101F on 3 February 1961. Little or no attention was given to stencils proclaiming the correct designation and block number of F-101s after they left McDonnell, and at least one F-101 was marked 'F-101B or F', leaving the ultimate determination to the observer. However, block numbers were used extensively in F-101 technical orders to designate differences between individual airplanes and how they affected day to day operations and maintenance.

McDonnell quickly fell behind schedule modifying F-101Bs with dual controls and never caught up. USAF maintenance documents list only seventy-nine F-101F serial numbers. F-101F utilization rates and flying times were consistently higher than those of the F-101B, since they fulfilled two basic missions. They were fully mission capable, carrying armament and fire control systems identical to the F-101B.

TAC was very short on F-101Fs for transition and crew training duties at Shaw AFB, and when a number of non-mission capable F-101Bs, which had been used for various flight test programs, were released to TAC in 1961, they were stripped of any remaining intercept equipment and there after referred to as TF-101Bs. A smaller number of stripped F-101Fs with dual

(Left) The nose mounted inflight refueling system was removed and replaced by an IR sensor. The IR sensors were quickly retrofitted to squadron aircraft.

(Below) The 444th FIS at Charleston AFB, SC was arguably the best sunbelt F-101B unit in ADC during 1962, winning several maintenance, flying safety, and ADC 'A' Awards, then capping 1962 off with the Hughes Trophy. 29 May 1967 (Douglas D Olson)

controls were also used at Shaw and usually referred to as TF-101Fs. There i no indication that either model was specifically modified with equipment ad ded for training aids and both 'TF' designations were apparently unofficial

The 4414th Combat Crew Training Squadron (later redesignated the 31s Tactical Reconnaissance Training Squadron) at Shaw became a dumpin ground for oddball 101s, operating a wide variety of pre-production F-101s RF-101s F-101Bs and F/TF-101B/Fs. They frequently had to resort to bor rowing airplanes from several operational 101 units in order to complete thei vital training mission during the height of hostilities in Southeast Asia.

Canadian Voodoos

In OPERATION QUEEN'S ROW, the United States and Canada entere into an agreement on 12 June 1961 which called for the transfer of sixty-si F-101B and F interceptors, twenty-eight spare engines and five fligh

(Above) A dual control F-101F-8-MC of the 4756th Combat Crew Training Squadron (CCTS) at Tyndall AFB, Florida during a stop at Kelly AFB, Texas in January of 1973. For cross country hops the F-101B could be equipped with a baggage container fitted below the weapons door between the strakes. (Norman E Taylor)

(Below) Dual control F-101F-96-MC of the 62nd FIS at K I Sawyer AFB, Michigan. Tail colors were Red with Black trim. 11 July 1968 (Douglas D Olson)

simulators to Canada in exchange for Canadian assumption of operating, maintenance, and financial responsibility for sixteen prime radar sites on the Pinetree Line (a portion of the Distant Early Warning DEW Line) defenses for the North American Continent. The US also subsidized the production of some 200 F-104G Starfighters to be built in Canada for other NATO air forces.

The sixty-six Voodoo Interceptors were almost new (Fiscal Year 1959 airplanes), and were thoroughly inspected and brought up to the latest Technical Compliance Technical Orders (TCTO) standards before the Royal Canadian Air Force took delivery. There were fifty-six F-101Bs and ten dual control F-101Fs, which equipped four operational fighter squadrons, (No 409, 410, 414, and 416 Squadrons) and one training squadron (No 425 Squadron) between 25 July 1961 and 3 May 1962. The aircraft were taken from operational USAF units at Hamilton AFB (38),Lockbourne AFB (22), and Griffis AFB (4), which resulted in some shifting of tail numbers within USAF. The Canadians redesignated their Voodoos to CF-101B and CF-101F, and gave them composite serial numbers by adding a 17 prefix to the last three digits of the original USAF serial number. The sixty-six CF-101s carried serials ranging from 17391 (USAF 59-391) through 17483 (USAF 59-483, which was the last F-101 Voodoo built).

In 1964 No 410 'Cougars' and 414 Squadrons were disbanded, with their aircraft either being distributed to the remaining units or placed in reserve. The 'Alouettes' of No 425 Squadron at CFB Bagotville, Quebec became an operational unit, while the reactivated No 410 AW (OT) at Bagotville trained CF-101 aircrew. The 'Nighthawks' of No 409 at CFB Comax, British Columbia and No. 416 'Lynx' Squadron at CFB Chatham New Brunswick rounded out the Canadian units flying CF-101s.

One of the ten dual control CF-101Fs (17-407) of No 425 Squadron 'Alouettes' Operational Training (OT) squadron, carrying the initial RCAF Voodoo markings, which were changed in 1962. (RCAF)

Winding down USAF Interceptor Operations

The F-101 was not allowed to compete in the William Tell Weapons Meet until 1961, in which Lt Col Sam C Wilkerson and his 445th FIS from Wurtsmith won Category I honors in an extra mission shoot off with the 83rd FIS from Hamilton to win the first 101 competition. Accidents took a heavy toll of F-101B interceptors during the early years, and although the accident rate had fallen to 19 per 100,000 flying hours by 1962, Lt Col Wilkerson became one of the casualties on 28 June of that year.

During the Cuban Missile Crisis most F-101B units deployed portions of

(Below) CF-101B (17-404 ex USAF 59-0404a) at Wurtsmith AFB, Michigan during July of 1968. Note the markings change from the above photo. When delivered the Canadian Voodoos carried the latest and most up to date USAF interceptor equipment. (Douglas D Olson)

(Below) RCAF CF-101s during a bitterly cold Canadian winter. Since salt could not be used on runways because of the corrosion it caused, 'Winter tires' with steel stud like devices for improved braking on slick snow packed runways were commonly used for a time in both Canada and the US, but their use has since been discontinued in the United States. In a confirmed war situation, interceptors would be launched regardless of runway or weather conditions. (RCAF)

their fleet to dispersal facilities around the country. Many of these sites were updated and maintained as permanent detachment facilities after the crisis subsided.

Hamilton's 83rd FIS was deactivated during May of 1963, reducing the ADC F-101 fleet to sixteen operational squadrons. Most units were equipped with fifteen F-101Bs and three F-101Fs, but some squadrons were strengthened to twenty-four aircraft because of heavier operational commitments.

The 445th FIS became the first unit ever to win back to back William Tell championships. Winning in 1961 and repeating in 1963, thanks to some late inning heroics by Lt Col William E Shelton and Captain Robert W Stamm.

The 1965 William Tell competition was significant because it was the first to include all of the Century Series Interceptors (F-101 Voodoo, F-102 Delta Dagger, F-104 Starfighter and F-106 Delta Dart). K I Sawyer's 62nd FIS edged out the 13th FIS Bulls by a mere 115 points to win. The 62nd had been the first F-101B squadron to meet its original alert commitment date, and also the first FIS to score a hundred per cent success rate with the primary armament, achieving that milestone in firings at Tyndall in August of 1960. Several 62nd aircraft were marked 'World Champs '65' in large letters after the 1965 meet. They also proudly proclaimed themselves 'Defenders of SAC' in smaller letters under the 'World Champs' inscription. Several ADC squadrons were tenants on SAC bases, and those markings more or less typified the condescending attitude of many ADC fighter jocks had toward their SAC hosts.

The high spirited fighter pilots were usually heavily out ranked by their SAC counterparts, and they found it difficult to escape the endless SAC regimentation (vernacularly dubbed 'chickenshit') was a frequent source of friction. The fighter jocks got in their licks more often than not, becoming a constant source of aggravation to the SAC people. A favorite F-101B trick was to 'give'em the probe' ... an aerial substitute for the universally recognized display of the middle digit. This practice died when the seldom used refueling probes were removed and IR detection and tracking gear was installed on the nose of the 101 interceptors. It was not uncommon for supposedly 'tightly secure' SAC facilities and SAC aircraft to mysteriously become festooned with fighter unit badges after a particularly raucous fighter party. There were rarely open hostilities involved, but the depth of the rivalry had the salubrious effect of turning the high line fighter squadrons into outstanding units. The combination of SAC, a tough environment, and a common goal motivated average airmen to uncommon achievements. These 'high Line' squadrons were the pride of ADC's Voodoo interceptor fleet during the 1960s when they won every Category I competition at William Tell.

The overall experience level of USAF F-101B units probably peaked in 1965 when many of the 800 to 1,000 hour veterans began receiving combat assignments in Southeast Asia, flying other types of aircraft.

Citing a reduced threat from manned bomber strikes, USAF deactivated nine F-101B squadrons. A significant number of the aircraft belonging to the deactivated 13th, 29th, 49th, 75th, 84th, 87th, 98th 437th, and 444th squadrons went into storage at Davis Monthan AFB. Many of those Voodoos that didn't go to the boneyard were used to upgrade the remaining

(Above) This 2nd FIS F-101B is standing alert at Suffolk County AFB, NY during the last days of operational USAF service. Suffolk AFB was the home of the 2nd and 98th squadrons of the 52nd Fighter Interceptor Wing. 13 November 1969 (Abbott Hafter)

(Above) A pair of 75th FIS F-101Bs await an uncertain future at Davis Monthan storage facility after their unit was inactivated at Dow AFB, Maine during March of 1968. The 445th at Wurtsmith AFB, Michigan was subsequently redesignated 75th FIS on 30 September 1968 in an instant history move but they too were inactivated during the following year. The rudder checks were Black and White. 11 March 1968 (Douglas D Olson)

(Above) The 60th FIS at Otis AFB, MA, the first squadron to receive the F-101B, flew the big interceptors longer than any other operational USAF squadron. F-101B-105-MC (58-279a) carries the unit's last markings, however the twenty inch squadron decal is missing from the tail. 17 November 1970 (Thomas S Cuddy II)

(Below) The Voodoo was employed as a test bed for several new weapons systems, including this first ATAR aircraft at Greenville, SC. 21 May 1971. (Jim Sullivan)

101 units. Not surprisingly, every pilot from every one of these units ended up in Southeast Asia.

During 1969 three more F-101B units were disbanded, and the aircraft belonging to the 2nd, 59th, and 445th squadrons were transferred to Air National Guard units, including Maine's 132nd FIS, Washington's 116th FIS, and North Dakota's 178th FIS. All three units successfully transitioning from F-102 Delta Daggers during the winter of 1969-70 and resuming their 24 hour alert commitments ahead of schedule.

North Dakota's 178th FIS was chosen to represent Air National Guard F-101 units at the 1970 William Tell meet at Tyndall AFB, Florida. Four North Dakota crews, each with less than 200 F-101 hours, scored perfect missions on the last day of competition to come from behind and win the event over more experienced USAF and Canadian crews, with Captains J P Reimers and A E Jacobsen winning the prestigious 'Top Gun' award.

Operation Peace Wings

During 1970 the USAF and Canadian Armed Forces found it mutually convenient to trade F-101s. The USAF had a large number of surplus F-101B and Fs in storage at Davis Monthan AFB. These had the updated autopilots, pitch, and fire control systems, while the Canadian CF-101s had not been up dated since delivery to the CAF. The Canadian airplanes were also lacking the later infrared tracking capability, which was especially valuable during low level intercepts and in electronic jamming environments. The Canadian CF-101s were newer airframes, and still had the inflight refueling probes, a significant factor, since USAF hoped to modify the Canadian Voodoos into low level photo reconnaissance aircraft.

Canadian maintenance officers selected sixty-six up dated FY 56 and FY 57 F-101B and Fs which were pulled from storage, test flown, then delivered to Bristol Aerospace Ltd at Winnipeg, Manitoba by American crews. Bristol technicians removed the American engines, afterburners, ejection seats, survival containers, communications and navigation equipment. This equipment was then reinstalled in the fifty-eight surviving FY 59 CF-101B and Fs being returned to the United States. The Canadian equipment, removed from the fiscal year 59 CF-101s being returned the US, was installed in the 'new' Canadian airplanes, which were then flown to Ling-Temco-Vought in Greenville, South Carolina by Canadian crews. At LTV, Hughes technicians brought the MG-13 fire control systems up to the latest USAF standards, while Minneapolis Honeywell technicians modified the MG-5 autopilots and pitch control systems. These modifications vastly improved the 'new' Canadian aircraft's overall capability and enhanced flight safety. LTV then painted the airplanes to Canadian specifications and they were delivered to Canada between November of 1970 and December of 1971.

Air National Guard

The last three operational USAF F-101B squadrons were phased out during the spring of 1971, leaving the ADWC at Tyndall as the only USAF operator of the F-101 Interceptor. The 18th FIS 101s were acquired by Oregon (142nd FIG, 123rd FIS), the 60th FIS transferred its aircraft to New York (107th FIG, 136th FIS), and Minnesota's 148th FIG (179th FIS) picked up the 62nd airplanes. During May of 1971 the 147th FIG (111th FIS) of the Texas ANG at Ellington AFB began acquiring F-101F trainers and established an Air National Guard F-101 transition school.

'The Happy Hooligans' of North Dakota's 178th FIS dominated the 1972 William Tell meet. Captain Robert E Carlson and 1/Lt Steve Brosowske flew a perfect mission, but lost Top Gun honors to a Canadian crew during a three way flyoff. The 'Hooligans' scored an incredible 15,484 points out of a possible meet total of 16,800, which was more than any other category of aircraft in the history of the meet. The 'Hooligans' weapons loading team also won top honors with a record score. All three F-101 teams competing in the 1972 meet scored more points than did the F-102 and F-106 category winners!

The Maine 'MAINEiacs' displaced the 'Hooligans' as champions in 1974, overcoming radar problems and winning by a narrow margin. Unfortunately, their glory was short lived, since they transitioned to KC-135s during the winter of 1975-76 and were denied the chance to defend their championship. Other ANG Interceptor units that lost their 101s in 1976 included Washington, also in favor of KC-135s, and Minnesota, which got RF-4Cs and went into the reconnaissance business.

The Bicentennial weapons meet was won by Oregon, which also produced the Top Gun, in Major Bradford A Newell and Lt Col Donald R Tonole. The 'Eager Beavers' 1976 victory was especially gratifying since many of their points were scored during poor weather conditions and after maintenance men had frantically worked all night to change an engine and beat a competition deadline. The state of Oregon ranks 35th in population, but their Fighter Interceptor Squadrons have won every major award in the business. Their trophy case holds more hardware than any other Air Guard unit.

(Above) Crewmen prepare to launch CF-101s of No 416 'Lynx' Squadron at Chatham, BC. The seven rudder stripes were Black and Yellow. c. 1963 (RCAF via Norman E Taylor)

(Above) CF-101B of No 416 Squadron in the latest markings carried by Canadian Voodoos. One of the 'new' pieces of equipment found on the 'new' CF-101Bs was the nose mounted IR sensor.

(Above) The first Minnesota ANG F-101B sortie was also the last F-102 sortie for the unit in April of 1972. (General Wayne Gatlin)

By the summer of 1977 only New York, Oregon, and Texas ANG were still flying operational 101 interceptors in the United States. 1977 was a good year for the One-O-Wonders though, 22,242 accident free hours being logged — a first, and even more impressive when compared to the loss of twenty-two airplanes in thirty-four major accidents during 146,927 hours in 1960. A very large percentage of all 101 accidents occurred during landings, frequently with utility hydraulic system failures in weather on wet runways. The loss of directional control due to hydraulic failures, a blown tire, a broken landing gear strut, and/or a degree of pilot error resulted in numerous instances of 101s veering off runways while landing. Invariably, this resulted in a collapsed landing gear, and frequently in severe damage to the aircraft. The much talked about 'pitch up' claimed a few aircraft, but modifications to the pitch control system in 1968 virtually eliminated this possibility. Most pilots believed that the aircraft was easy to fly, but terribly unforgiving. As former USAF test pilot Richard Baird put it; "It's the biggest by-the-book fighter I've ever flown — the Voodoo would bite you! You really had to fly it strictly by the book!"

The 1978 William Tell was won by the 'Texans' with 32,920 points, and Canadian Captains Earl Robertson and Bryan Salmon took the Top Gun award. The 'Texans' became the third 101 team to win consecutive William Tell competitions when they prevailed over teams from New York and Canada in what was the last competition featuring American 101s. The Top Gun award went to the 101 crew of Lt Col Maurice Udell and Major David Miller.

Oregon transitioned to F-4Cs during the fall and winter of 1980-81, leaving New York, Texas, and ADWC the only units still flying 101 Interceptors in

the United States. New York received its first F-4C on 4 November 1981 and closed out 101 operations during June of 1982. Texas began transitioning into the Phantom II shortly after New York, resuming their alert commitment in F-4s during the fall of 1982. The 'Texans' were among the last Air Guard units to acquire the Voodoo, and they were the last to operate Voodoo interceptors. During their eleven year F-101 tenure, the sharp shooting 'Texans' won the coveted William Tell weapons meet twice, briefly stood a second twenty-four hour alert commitment at NAS New Orleans and conducted an F-101 combat crew training school. Their five month long course was designed to prepare undergraduate (UPT) pilots for flying duties with operationalF-101B interceptor squadrons. Students started out with a minimum of eleven T-33 flights and associated classroom instruction over a four week period to update their instrument ratings. The F-101 portion included 120 hours of formal classroom instruction on the aircraft and its MG-13 weapons system in addition to fifty-nine sorties and seventy-five flying hours. Approximately ten sorties were devoted strictly to transition training.

Tyndall AFB, Florida was the last USAF base to give up the F-101B, just as it had been the first to receive the F-101B in 1958. Several different units were involved. Operational tests had been conducted there during the fall of 1958 and an operational combat crew training squadron was established to check out instructor pilots, and later, aircrews. This unit provided ADC with aircrews after the original checkout of squadron pilots was completed. Each ADC squadron deployed to Tyndall AFB at least once a year to fire live weapons (non-nuclear, of course!) and receive additional training. A small test squadron used school aircraft, when needed, to help develop and test new techniques before changes were introduced to the rest of ADC. The Tyndall airmen also stood alert commitments as political considerations dictated. When the pilot training mission transferred to the Texans at Ellington AFB with the phaseout of USAF F-101s during mid-1971, the old 4756th Combat Crew Training Squadron at Tyndall was redesignated the 2nd Fighter Interceptor Training Squadron in an instant history switch of designations. Emphasis was shifted from combat crew training duties to providing high performance targets and target tugs with an electronic counter measures capability for training ADC aircrews. All armament and fire control systems were stripped from most of the 2nd FITS F-101Bs and Fs to improve their overall performance. They were ungloriously referred to as 'tractors'. The 2nd Fighter Interceptor Training Squadron became the 82nd Tactical Aerial Target Squadron after TAC absorbed the old Air Defense Command. The 82nd operated F-101 'tractors' until 20 September 1982, when Lt Col Bruce A Sanders made the last American military flight in the Voodoo. Adding insult to injury, he delivered it to Drew Field where it was used as a live target for gunnery tests.

USAF and Air Guard Voodoos had logged a total of slightly more than 2,000,000 F-101 hours during more than 25 years of operational service. This does not include the test time by McDonnell or the operational hours flown by Canadian and Chinese pilots.

Canada continues to operate their CF-101B and F interceptors and they constitute a significant contribution to the North American Aerospace Defense Command. Canada has chosen the McDonnell F/A-18 Hornet (designated the CF-156 by the Canadians) to replace its aging CF-101s. Initial deliveries were scheduled for October of 1982, but CF-101s will probably remain in service until 1987, according to published reports.

Although Canadian crews won the Top Gun award, and their controllers frequently excelled, and their weapons loading teams performed well in competition with USAF and Air Guard crews at William Tell competitions, the big team trophy has eluded them. Canadian crews are considered fully equal to their American counterparts, and are especially acclaimed for their all weather prowess.

(Right) 08 a F-101B (580301) of the 123rd FIS, Oregon Air National Guard. The delta on the tail is Dark Green outlined in White, containing Tan stars. (Ron Thurlow)

(Above) F-101B-105-MC of the 178th FIS, 119th FG, 'THE Happy Hooligans', demonstrates aerodynamic braking after touchdown while landing at Hector Field, Fargo, ND. 20 Oct 1973. (Douglas E Slowiak)

(Above) F-101B of the 49th FIS, Griffis AFB, NY being refueled at Grand Forks AFB, ND during a cross country. (Douglas D Olson)

(Above) Genie armed F-101B of the 2nd FIS standing alert duty. Stars on the tail are Medium Blue. The Genie has large Insignia Red band around its center.

(Above) F-101Bs usually carried Data Link antennas mounted on the bottom of the port engine.

(Above) Large scoops on either side of the lower rear fuselage provided cooling to the aft engine bay.

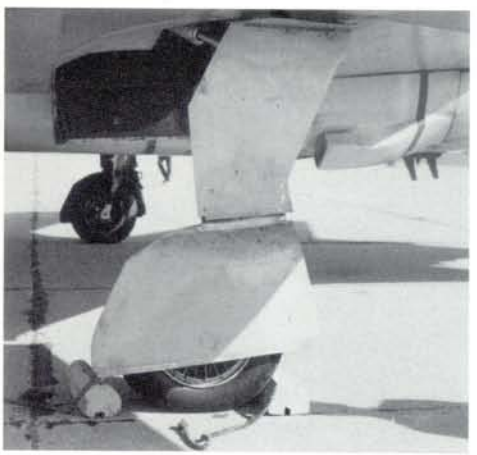
(Above) The exhaust and after burner on the F-101B was much longer than on earlier models of the Voodoo.

(Above) The nose wheel was steerable to 40 degrees to either side. Landing lights were mounted on the nose wheel Oleo.

(Below) Portside air vents. These and a pair of vents on the starboard side of the Voodoo were hot air bleeds.

F-101B

Interceptor Details



(Above) The larger and stronger tires of the F-101B decreased tire failure to a negligible level.

(Below) The spotlight mounted just below the aft cockpit was used to visually identify unknown aircraft during night interceptions.

(Below) The large air intakes of the Voodoo were segmented internally with a splitter plate.

F-101B of the Minnesota ANG. Markings are a combination of 62nd FIS (prior assignment), and Minnesota. The fin flash is Red with a White outline trimmed in Black. The serial block is White with Black numbers. (General Wayne C Gatlin)

(Below) F-101B-100-MC of the 123rd FIS, 142nd FG, Oregon ANG. The fin flash is Dark Green with a White outline and Tan stars. The numeral twenty on the speed brakes is in Black. (Dr Carlton A Eddy)

(Below) The 'Texans' were one of the first units to begin flying missions without external tanks. The duration of a tankless sortie was reduced in order to increase their frequency, since most commanders felt that a minimum of two missions per week were necessary to maintain peak proficiency. 3 June 1978 (Dr Carlton A Eddy)

RF-101B

The war in Southeast Asia resulted in the loss of more than two squadrons of RF-101Cs, leaving the remaining units short of aircraft and overextended. Officials were concerned that they would run out of RF-101s if the attrition rates of 1965 and 1966 continued for an extended period. Considering the successful conversion of the F-101A and C strategic fighters into RF-101G and H low level photo reconnaissance aircraft, it was decided to convert and test a single F-101B test aircraft (57-301) to reconnaissance standards using a kit assembled at Hill AFB. This successful conversion led to the eventual modification of twenty-two former Canadian CF-101B airframes into low level photo reconnaissance Voodoos. The work was performed by Ling-Temco-Vought, using kits supplied by Hill AFB, between September 1971 and January 1972. These modified airplanes were designated RF-101Bs and served for three years with the Nevada Air Guard before being replaced by RF-4Cs.

(Above) RF-101B (59-398 ex 17-398) at Kelly AFB, Texas in April of 1972. Trading ADC F-101Bs to Canada provided the Air National Guard with twenty-two refueling probe equipped CF-101s that were modified into RF-101Bs. (Norman E Taylor)

Stationed at Reno, The Nevada Air National Guard operated ex-RCAF CF-101s which had been modified to RF-101B standards by Ling-Temco-Vought using kits supplied by Hill AFB. This was the prototype for the RF-101B, and was never used operationally. 21 September 1972 (Peter B Lewis)

RF-101 Finis at Shaw AFB

During the early days of 101 Reconnaissance operations, brightly trimmed natural aluminum RF-101s were flown by 'One-O-Wonders'. During the early 1960s, the fleet was painted gray, and operational standards toned down to match the anonymousness of the mission. By the mid-60s the fleet had been given war paint and the 'Green Turkeys' were flown as never before, by pilots striving to survive their hundred 'counters' over Southeast Asia. The old warriors finished their USAF tours with a new nom-de-guerre when a Navy control tower operator referred to a transient RF-101 as "The Long Bird". The name was especially appropriate, since RF-101s were longer than their replacement, the RF-4C, and had longer legs (range).

Until the 20th TRS deployed to Southeast Asia during December of 1965, the reconnaissance pilots at Shaw served as global trouble shooters and ambassadors of good will. However, their role gradually evolved into preparing reconnaissance pilots for combat duty in Southeast Asia. It was not uncommon for the Shaw airmen to fly thirty to ninety temporary day duty (TDY) tours in SEA themselves. In fact, several pilots completed their full twelve month SEA tours doing TDY tours!

Until 1965 the 4414th Combat Crew Training Squadron (CCTS) had been transitioning pilots into the RF-101. Since combat units desperately needed journeymen reconnaissance pilots who could learn local procedures during an operational check flight and go to work immediately, the last operational RF-101 squadron at Shaw, the 29th TRS, became a finishing school for recce pilots. Returning combat veterans knew what was required of a reconnaissance pilot to survive a hundred missions over North Vietnam, and Shaw quickly developed into an outstanding school for recce pilots. The acute pilot shortage of mid-1966 was quickly overcome, and by years end, the 45th had more pilots than were required and some well qualified reconnaissance jocks were being assigned to non-flying jobs. This unpopular practice prevented the 45th roster from exploding with pilots and allowed those in flying positions to stay current.

With the winding down of the Vietnam War and the planned phaseout of USAF RF-101s, both the 4414th and the 29th began training Air Guard pilots who would inherit their RF-101s. The 29th's RF-101s were delivered to Michigan's 127th TRG at Selfridge AFB during January of 1971 and the 29th went out of business. Lt Col Roland L Richardson was the last USAF RF-101 squadron CO and closed out an era when he delivered the last 31st TRTS (ex 4414th CCTS) RF-101A to Selfridge on 28 February 1971.

During approximately 13 years and 10 months of operational service, RF-101s served four American Presidents. And all four had dispatched them to world trouble spots on intelligence gathering missions. RF-101s were used in clandestine and/or combat operations by USAF and Chinese Nationalist pilots during twelve of the thirteen years they served, 1959 being the only year between 1958 and 1971 that RF-101s were not getting shot at! But after their widely publicized record flights of 1957-1959, RF-101 pilots became practically anonymous.

Most veteran recce pilots learned to love and trust the RF-101 with it's rugged twin engine dependability. As veteran combat pilot (251 missions) Major Jerry D Lents said; "I like the airplane because it flies well, because it has one seat, and because it flies in the daytime. It is the best day, VFR reconnaissance airplane they ever made!"

Perhaps as few as 700 USAF pilots flew the RF-101, and a large percentage of them became combat veterans. High minimum flying experience requirements were established which excluded most young pilots from flying the airplane prior to the Undergraduate Pilot Training Program. Consequently, most pilots came to RF-101 units with at least one tour in fighters or as instructors at training bases. By the time they had flown one or more tours with RF-101 units they were senior enough to qualify for management positions in fighter squadrons, but were frequently lacking in gunnery and ordnance qualifications. This made it difficult for them to find flying jobs with fighter units, and as a result, many of them stayed in reconnaissance operations and in RF-101s. TAC was very reluctant to release experienced reconnaissance pilots from the early 1960s until hostilities in SEA were concluded. A significant number of these reconnaissance pilots alternated between Shaw and USAFE or PACAF units in a closed loop. Reconnaissance units were generally composed of older and more experienced pilots, compared to contemporary fighter squadrons. First Lieutenants were few and far between after the original units transitioned into RF-101s, and 'Brown Bars' (Second Lieutenants) were almost unheard of in the RF-101 recce program until late in the program, and when Air Guard units began receiving the RF-101.

The sheer number of new recce pilots required for the heavy volume of work in SEA from 1965 on changed this cycle. As the supply of ADC interceptor pilots, ATC instructors, and SAC B-58 types dried up, a number of support, tanker and transport pilots entered the program. Most of them performed satisfactorily, especially the younger ones who had flown T-38s during their flight training. The F-101 and T-38 had a number of flying characteristics which were very similar, particularly during landing. The F-101 was an easy airplane to land but demanded a 'by the numbers' pattern and approach. The airplane could develop a tremendous sink rate with fatal consequences if a pilot got careless. Missed approaches and go arounds required approximately 500 pounds of fuel and the decision to make a go around had to be made quickly. There were no touch and go landings in the F/RF-101.

The airplane's reputation for eating pilots alive was largely due to its terribly unforgiving nature in the traffic pattern and the 'pitch up' phenomenon. Both areas of concern were easily avoidable by simply flying

(Below) Lou Drendel (right) with the 'One-O-Wonders' he flew with in 1973.

by the book. The degree of danger and difficulty associated with the basic reconnaissance mission cannot be overemphasized. American RF-101s were involved in more than one-hundred major accidents. Well over forty Chinese and USAF RF-101s were lost during combat operations. Approximately two of every three reconnaissance RF-101s were lost in accidents or combat operations!

Two Flights

Both of the authors have been privileged to fly in the Voodoo, and while these flights occurred almost a decade apart, their impressions are remarkably similar.

Drendel:

I was visiting Mexico Beach, Florida on vacation in April of 1973. Since Mexico Beach is close to Tyndall AFB, and since Tyndall is one of the USAF installations which has an altitude chamber, I thought it would be a good idea to update my chamber card. The update consisted of four hours of lecture, wherein the instructor scares hell out of you by describing the horrors of high altitude flight without benefit of oxygen or pressurization, followed by a session in the chamber itself.

(Above) F-106B breaks off after a low altitude practice intercept of Rare 61, the F-101B in the foreground. (Lou Drendel)

As I recall, we were taken to 35 or 40 thousand feet, then a 'volunteer' was selected to remove his mask and demonstrate how goofy one can get in a very short time when deprived of oxygen. We were also introduced to the wonders of pressure breathing. On most modern jets, pressure breathing only occurs above 40,000 feet. In the 101, pressure breathing was employed all the time! Pressure breathing consists of a reversal of the normal inhale/exhale exercise. Oxygen is forced into your lungs, and you have to force it out. When pressure breathing, it is necessary to relax as the oxygen is forced into your lungs, then blow it out. Until you have practiced, and really gotten used to pressure breathing, you have to concentrate on breathing. When you are distracted by the Jules Verne atmosphere of the chamber, or a ride in a high performance fighter, concentration can be difficult. The penalty for failure to pressure breath properly is usually hyperventilation. At this point, you could probably be forgiven for asking yourself if this trip was really necessary!

I don't know any pilot who enjoys the altitude chamber, and I certainly didn't want to have to go through it without getting the opportunity to 'break in' my fresh card. Fortunately, I was able to successfully lobby for a ride in the back seat of an F-101B of the 2nd FITS. My visit coincided with a visit by the USAF Inspector General. Which provided for an enthusiastic reaction by base security forces when they failed to get the word that a photographer would be on the flight line. My USAF escort was embarrassed and chagrined — but we were still pinned against the side of a truck until the proper 'word' filtered down from the command post. Major Larry Griffin was a member of the IG team, and an F-101 jock who needed some flight time to stay current.

(Above) F-101B, Rare 61, of the Air Defense Weapons Center, April 1973. (Lou Drendel)

He generously allowed me to sit behind him while he got his time in. He also answered my anxious questions about the 101s notorious pitch-up problems. (Paul Stevens had already been filling my head with horror stories even then!) Larry Griffin, however, seemed downright unconcerned about pitch-up — telling me that "we have developed techniques to avoid it without any problem."

We were Rare Flight, a pair of F-101Bs. Rare 64 was lead, flown by Griffin, while Rare 61, the wingman, was flown by another experienced fighter pilot staying current. Col R W Reeves was pilot, with one of the 2nd FITS Instructor Pilots, Lt Col John Nolan keeping a critical eye on the whole flight from his back seat. We were scheduled for takeoff at 1330 local, and by the time I squeezed into the back seat it was after 1300.

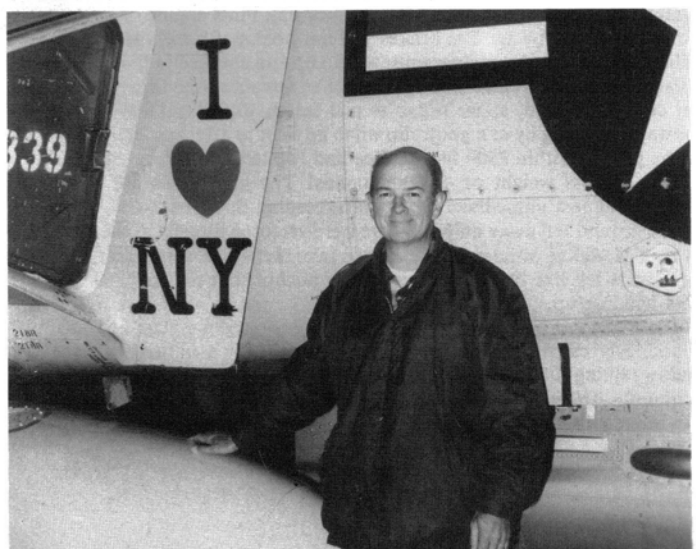
By almost any other jet fighter standards, the F-101B cockpit is roomy, and I suppose it is relatively easy to get into the front office, but I'm just as sure that plenty of back-seaters have scratched, scraped and bumped extremities while trying to slide under the canopy rail, especially when scrambling after bogies!

The weather was typically good. Scattered to broken clouds at 4 to 5,000ft and light winds. We did our runup and taxied into position. As soon as 'Whetstone' control cleared us, Griffin advanced the throttles to military power, then into afterburner. I was prepared to be unimpressed with the 101, having previously flown in the F-4. But the acceleration of the Voodoo was, if anything, more impressive than the Phantom! We raced down the runway, rotated, and climbed like a rocket. Griffin turned right, and I looked back to see Reeves slide up into position on our wing — a perfect joinup.

We climbed to FL 250 and began trolling for F-106s. This was, after all, the Air Defense Weapons Center, and they had student interceptor pilots to train. I was busy photographing our wingman, and being suitably impressed with the breathtaking vistas only available from a fighter cockpit at altitude, and never saw the F-106s as they attacked and reattacked from head on and astern. After a brief excursion to FL-350 for more intercepts, we descended to low level for another set of intercepts.

The clouds had become more broken than scattered by the time we settled down to our low level route at 2,000ft. The afternoon thermals gave us a moderately bumpy ride, and visibility was down to six or seven miles in haze. High altitude see forever vistas are impressive, but then so are low levels in a jet fighter. Down here, you can really tell how fast you are going, and you get a chance to be impressed all over again. The two F-106Bs had no trouble finding us, and they pressed their attacks to within a few hundred feet before

(Below) Paul Stevens standing next to a life time love, the F-101 Voodoo.



breaking off to left or right, giving us the chance to get a good look at them.

We made a standard fighter approach, with a 3G pitchout from initial, followed by a smooth pattern and even smoother touchdown.

Stevens:

I got my 101 ride thanks to Lt Col Frank McKee and the New York Air Guard. The 136th FIS, at Niagara Falls International Airport, was maintaining a five minute alert posture, fulfilling the mission of air defense for their sector of the Northeastern United States. Full time civil service employees, known as Air Technicians, constituted one third of the numerical strength of the unit, but were responsible for most of the aircraft maintenance and all of the unit management. They worked a regular 40 hour week and wore the same uniform as their 'weekend warrior' compatriots.

Most Air Guard units with alert commitments employ a small number of part-time Guardsmen working virtually full-time, pulling alert duty. These unique so-called 'part-timers' free up regular Guardsmen to work at their civilian jobs, while belonging to, and contributing to the mission of the Air National Guard. Most regular Guardsmen belong because of their love of flying, and/or the camaraderie associated with military aviation.

Outstanding aircraft maintenance and experienced aircrews combine to make the Air Guard a winning team. As Captain Greg Williams told me; "I believe in the Guard. I really do, because I know we can do the mission — and, we are out in the civilian world, twenty-four days a month, being productive in other ways." Air Guard units meet the same standards set for regular USAF units, and frequently outfly them in competition.

I was impressed with the attention given to flight safety prior to our flight. Col McKee turned me over to life support specialist T/Sgt William Baldwin, who was responsible for storage, maintenance, security and use of life support equipment. He carefully explained how the equipment worked, what the potential hazards of high altitude flight were, and how to react in an emergency situation. I was loaded down with gear, and my mind was buzzing when he finished. The preflight briefing revealed that our mission would be an ECM mission against a high flying B-52 Stratofortress over Lake Ontario. The 'BUF' would be trying to elude ground radar tracking stations, and once detected, would take evasive action, drop chaff, and try to jam our radar and radio equipment with ECM. Our ground radar control would be from SAGE center at Syracuse, New York, using voice communications.

You don't realize how big the F-101 is until you climb that ladder, or how small the cockpit is until you try to crawl in and get comfortable. Sgt Baldwin swore you had to be uncomfortable to be secured properly and he made sure I was both as Col McKee did the preflight walk around. Once he had strapped in, McKee made sure the ICS was on hot mike, tested the ejection warning light, and started the engines. The J-57s started quickly and wound up easily in the sub-freezing temperature of 5 December 1980.

I got a very lonely feeling as the ladders were removed and the canopy was closed and sealed. No more Sgt Baldwin to guide me and answer my questions about this strap or that switch. It didn't last long though, as things began to happen. Col McKee taxied out of the cold barn and headed to the last chance inspection area adjacent to the alert barn.

I had a ringside seat for a real scramble, as the alert birds were sent out to check out an 'unknown'. Alert airplanes are armed and set up so that a crew can climb aboard and start their engines while the crew chief straps them in. It is not uncommon for alert airplanes to be airborne within two or three minutes of being scrambled. That day's unknown turned out to be a B-57 Intruder (Canberra) sent to test the 136th readiness.

Once our airplane had been checked at 'last chance' for hydraulic leaks, damaged tires, or FOD damage, we were cleared to taxi to the active runway. McKee taxied very slowly, explaining that the main gear had a tendency to 'walk' and that the minor bumping was normal. Final engine runup was performed on the runway. The brakes will not hold a 101 with both engines at military power, so the engines must be run up and checked individually. Once satisfied that the airplane would fly, McKee advanced the throttles to eighty per cent power and, as we began to roll faster, to full military power. The runway was going by at a good clip when he went to afterburner. What a kick in the pants! Within 2300 feet McKee had rotated and we were airborne ... this at a gross weight of 48,600 pounds! The gear and flaps had to be retracted almost immediately to avoid exceeding their structural limits.

The ground fell away quickly as we were vectored directly at the oncoming B-52. Col McKee came out of burner to save fuel as we were passing through 4,500ft. It felt like he had thrown out an anchor, but the airspeed indicator kept winding up.

The F-101 has a continuous pressure (liquid) oxygen system and you must consciously exhale against the system. This is not a natural reflex and it makes talking difficult. I could hear Col McKee's labored breathing as he communicated with the flight and ground control as we continued toward our intercept.

F-101B Interceptors are set up under a two man crew concept and normally require a Weapon Systems Operator (WSO) to function effectively. Since I was occupying the 'Wizzo's' seat, the aircraft had lost most of its tactical capability. Our first attack would have been a head on 'snap up' using AIR-2A Genie nuclear ballistic rockets. The head on snap up can be used effectively against targets with altitude and/or speed advantages over the interceptor. It is safer to intercept targets with an altitude advantage because visibility above the nose is far superior to that below the nose. The Voodoo is fully capable of intercepting and destroying targets at night and in weather, but safety of flight during normal peacetime missions is enhanced if visual contact can be made with the target.

The head on snap up attack is best accomplished by positioning yourself twelve o'clock low on the target. Ground or airborne (AWACS) controllers who have an overall picture of the situation are responsible for this positioning of the fighter. If the WSO had been on this mission, our radar would have detected and locked onto the B-52 at a range of more than thirty miles. At approximately ten miles, the pilot would pull up into a thirty degree climb, trading airspeed for altitude. The firing phase is basically automatic once the pilot has made his weapon selection. The armament door rotates, exposing the AIR-2A Genies as the aircraft approaches the proper firing range. Door rotation is akin to the sensation of crossing railroad tracks in a car. The rocket firing can be seen and felt in the cockpit.

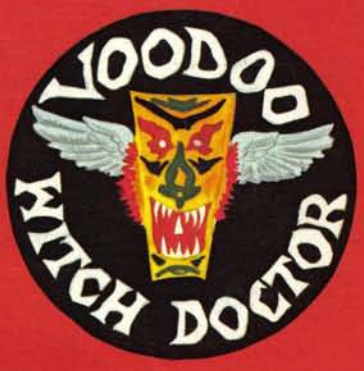
The ballistic AIR-2A rockets have a large kill radius and it is necessary to get as far away as possible, as soon as possible. The necessary trade off of airspeed for altitude can result in uncomfortably low airspeeds during the firing phase where the aircraft is particularly susceptible to pitchup. To recover after a rocket is launched, the pilot unloads, rolling the aircraft inverted, and diving away. While the aircraft is inverted the crew is shielded from blast by the tough underbelly of the Voodoo. After the blast and flash the aircraft is rolled again and recovered from the shallow dive.

Very high altitude head on snap ups against high speed targets tax the WSO and his fire control system to their limits. The system has limited 'G' capability and the pilot must exercise optimum technique at the upper end of the flight envelope to avoid problems. This maneuver is routinely flown at night, on instruments, and in weather! It could become a very hairy experience if proper procedures were not followed. Former WSO Lt Col Marion H Havelaar recalls having flown with an inexperienced pilot who went over the top in afterburner at supersonic speed. They dove into heavy clouds, breaking out at 18,000ft in a vertical dive at Mach 1.4! A panic pullout resulted in heavy structural damage to both the 101 and Havelaar. (The accelerometer was pegged at 8 Gs) Fortunately both he and the 101 were able to return to service.

Our first pass should have destroyed the target, but we were repositioned for a stern reattack. This could be for the purpose of another firing pass, or for a damage assessment pass. On this flight, it turned into a cat and mouse game, as the 'BUF' took evasive action, turning inside our weapons firing capability. We did an overshoot, then went after him again. The 'BUFS' Electronic Warfare Office was busy trying to jam our radar and communications with 'music' (ECM). A BUF can be a challenging target, especially if the crew is on the ball, listening to the interceptor's controller, and timing their evasive action or the dropping of 'rain' (Chaff) to coincide with the attack.

We returned to Niagara Falls after a pass down the St Lawrence river, entering initial at 350 knots for a left break and pitch out to downwind. Col McKee made a feather smooth landing at 155 knots, deployed the drag chute and kept the nose high for maximum aerodynamic braking. The nose came down at about 100 knots and the airplane decelerated with moderate braking. We turned off the runway, dropped the chute, and taxied into our barn. The crew chief had the ladders in place as soon as the canopy opened, and had started servicing the airplane before my somewhat shaky legs had me on the ground.

(Below) New York ANG F-101B formates with the B-52G it has successfully intercepted. (Edwin K Kitow, Jr.)



F-101B of the 437th FIS standing alert duty in the early 60s. Its crew is scrambling in response to an intrusion of the CADIZ.

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